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**An investigation of underlying mechanisms contributing to  
the maintenance, development, and exacerbation of features  
associated with Borderline Personality Disorder: The role  
of metacognition, emotion regulation suppression, and the  
lack of emotion regulation reappraisal**

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**A thesis submitted for the degree of  
Doctor of Philosophy**

**The University of Edinburgh  
2015**

## **Declaration**

I declare that:

- (a) I am the sole writer of this thesis
- (b) This thesis is my own work
- (c) This thesis has not been submitted for any other degree or professional qualification except as specified.

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Luis Salayandia

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Date

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# **Abstract**

## **Background**

Borderline Personality Disorder (BPD) is considered to be one of the most debilitating and difficult to treat mental disorders. Traditionally, studies investigating the aetiology and mechanisms associated with the development and exacerbation of BPD have relied on the use of clinical populations. As a consequence, the opportunities to understand vulnerabilities and fundamental processes that may contribute to the development and maintenance of the disorder have been limited.

## **Objectives**

The aim of this study was to examine the potential interactions and mediating effects of metacognition and emotion regulation on the relationships among different forms of childhood abuse, attachment, and parental bonding with a composite of core BPD features designed to encompass major areas of personality functioning and pathological personality traits (per DSM-5 section III).

## **Method:**

A non-clinical sample of 695 students in the city of Edinburgh, Scotland took part in an internet survey composed of a battery of self-report measures. This was geared to identify features associated with BPD, emotion regulation difficulties, characteristics of metacognition, adult insecure attachment, fundamental parental bonding styles and signs of childhood maltreatment. Structural Equation Modelling (SEM) was used to analyse the data.

## **Results**

All variables of interest had a direct effect on the development of features associated with BPD. Metacognition was found to mediate the effects of all three forms of childhood abuse used in the study as well as the effects of adult insecure attachment on the development BPD related traits. Emotion regulation suppression was found to mediate the effects of sexual and physical childhood abuse (but not emotional abuse, adult insecure attachment, parental bonding indifference, or parental bonding overprotection) on the development of borderline features. In addition, the lack of emotion regulation reappraisal was found to mediate the effects of sexual abuse and adult insecure attachment (but not emotional or physical abuse, parental bonding indifference, or parental bonding overprotection) on the development of BPD related traits.

## **Discussion**

These findings have important clinical and theoretical implications. The results provide support and understanding of the role of mediating mechanisms in the exacerbation and in the development of features associated with BPD. This is important because metacognition and emotion regulation may be more amenable to change than traumatic past experiences and/or deep seeded patterns of attachment. In addition, further development in this area of research has the potential to lead to better and more effective psychotherapeutic treatments for BPD.

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# 1 INTRODUCTION

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Borderline Personality Disorder (BPD) is a severe disorder characterized by enduring, inflexible and persistent patterns distinguished by cognitive impairments, marked impulsivity, and negative affectivity, as well as pervasive and excessive patterns of instability that have severe effects on self-image and interpersonal relationships (American Psychiatric Association, 2000, 2013). Borderline Personality Disorder was first documented as a mental disorder in the third edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-III) released in 1980. However, the symptoms that are now widely acknowledged as part of the borderline diagnosis were first recognised in the late 1930s (Gunderson & Links, 2008). Initial attempts to treat borderline symptoms were unsuccessful. This trend continued for the next few decades as borderline symptoms did not respond well to the psychoanalytical approaches which were prevalent for great part of the 20th century. The continued lack of success eventually led to the belief that borderline symptoms were too complex to be treated. Even after the recognition of BPD as a disorder, the negative view of borderline symptomology has continued and it remains prevalent today among many mental health professionals (Gunderson, 2009).

In recent years, contrary to the long held negative view of BPD, the results of psychopharmacological and psychotherapeutic approaches to the treatment of BPD have been promising (Bateman & Tyrer, 2004; Perry, Banon, & Ianni, 1999). In randomized control trials, psychotropic medications (e.g. haloperidol, amitriptyline, imipramine) have been found to be more effective than placebo in the treatment of some of the symptoms of BPD (Soloff et al., 1993; Leichsenring, Leibing, Kruse, & Leweke, 2011). It is important to mention however that these results have not been consistently validated and much more research is still needed. Likewise, in the case of psychotherapy, some psychotherapeutic approaches (Dialectical Behaviour Therapy, Mentalization-Based Treatment, Schema-Focused Therapy, etc) have shown to be beneficial in the treatment of some of the symptoms of BPD; yet, none

of these treatments have led to the remission of the disorder (Leichsenring et al., 2011).

Due perhaps to the severity of the symptoms of BPD, the main focus in borderline research has concentrated on the development of effective treatments. Much less attention has been paid to the study of the possible mechanisms underlying the development of BPD (Cheavens et al., 2005). Despite the fact that the aetiological factors contributing to the development of BPD are still unknown, it is considered that BPD is the product of the interaction of biological and psychological predisposing factors and environmental events, as is the case for most mental disorders (Lieb, Zanarini, Schmahl, Linehan, & Bohus, 2004; Linehan, 1993). A review of the literature identified several factors which have been postulated as partial contributors to the development and maintenance of BPD including childhood maltreatment (Bezirgianian, Cohen, & Brook, 1993), mentalization (Fonagy & Bateman, 2007), emotional regulation (Linehan, 1993; Bland, Williams, Scharer, & Manning, 2004; Yen, Zlotnick, & Costello, 2002), and attachment (Timmerman & Emmelkamp, 2006). Furthermore, as noted by Lobbestael & Arntz (2010), of the factors above mentioned, childhood maltreatment and attachment have consistently been found to have an impact in the development of BPD. It is important to note however, that the mechanisms through which this happens remain, for the most part, unknown. Also important is the fact that childhood maltreatment and attachment have also been associated in the development of problems of mentalization and emotion regulation in clinical populations outside the context of BPD (Van der Kolk, Hostetler, Herron, & Fisler, 1994; Winston, 2000).

## **1.1 Borderline Personality Disorder**

Borderline personality disorder is noted by the APA in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) as a debilitating mental disorder common in clinical populations that is associated with high comorbidity rates with other mental disorders including depression, anxiety, other personality disorders, etc. Borderline Personality Disorder is also associated with high rates of suicide, impairment in interpersonal functioning, high use of mental

health services including hospitalisation, and is often seen as a burden to society and a drain of its resources (Leichsenring, Leibing, Kruse, New, & Leweke, 2011).

### **1.1.1 Borderline Personality Disorder and the DSM**

Until recently, in all past editions of the DSM, only a categorical approach to the diagnosis of personality disorders had been considered by the APA even though problems with this approach to the diagnosis of personality disorders had long been documented (Skodol et al., 2005). In the specific case of BPD, the most controversial issues and those that have received the most attention are (A) high comorbidity between BPD and other personality disorders, (B) the heterogeneity of the diagnosis which may lead to the possibility of BPD being diagnosed in 151 different ways (per DSM-IV criteria and by extension DSM-5 section II criteria), (C) arbitrary diagnostic thresholds with insufficient empirical background, and (D) limited validity and clinical utility (Skodol et al., 2002; Sperry, 2003).

It is important to note that the descriptive characteristics of BPD are seldom questioned and are believed to be a good representation of the disorder, yet not all the psychopathological characteristics of the disorder are included in the general DSM criteria (Skodol et al., 2002). It is also important to understand that, as noted by the APA (2000, 2013), the DSM is meant to be used only as a “guide” in the organisation of information relating to mental disorders that can ultimately only “assist” a clinician to make a more informed and accurate diagnosis. In other words, the DSM is only one of many tools a clinician must use in order to better understand a patient’s presenting symptoms. Other resources such as empirical evidence, clinical experience, and current research must also be taken into consideration when trying to attain an accurate diagnosis of mental disorders. After all, according to the APA (2013):

Reliable diagnoses are essential for guiding treatment recommendations, identifying prevalence rates for mental health service planning, identifying patient groups for clinical and basic research, and documenting important public health information such as morbidity and mortality rates. (p. 5).

In the process preceding the release of the most recent version of the DSM, the DSM-5, the Personality and Personality Disorders Work Group (the group in charge of reviewing recent research, compiling general feedback in the current diagnostic model, and ultimately proposing changes to the personality disorders section of the revised fourth edition of the Diagnostic and Statistical Manual of Mental Disorders [DSM-IV-TR] to the DSM-5 task force) proposed to overhaul the current approach to diagnosis outlined in the DSM-IV-TR. The proposed changes by the group advocated for modifications to the diagnostic criteria of personality disorders (including BPD) and suggested the abandonment of the categorical approach to diagnosis used in the DSM-IV-TR in favour of a dimensional approach (Morey & Skodol, 2013). One of the main criticisms of the approach to diagnosis in previous DSM versions was that it had serious limitations and lacked consistent validity (Dalal & Sivakumar, 2009; Kendell & Jablensky, 2003). The proposed dimensional approach was a way to address these criticisms as the suggested changes were based on empirical evidence from vast past and present research (Morey & Skodol, 2013; Skodol, Morey, Bender, & Oldham, 2013). However, even though the recommended changes were supported by the DSM-5 task force, the adoption of the changes was eventually rejected by the APA board of trustees in order to preserve “continuity with current medical practice” (Morey & Skodol, 2013). Hence, the diagnostic criteria and the categorical approach to the diagnosis of personality disorders used in the DSM-IV-TR remained unchanged in Section II of the updated version of the DSM. However, in order to address the many issues and criticisms with the current diagnostic criteria, the decision was made to include the proposed dimensional approach in Section III of the DSM-5 as an alternative model meant to be used only as a guide and as a foundation to further future research (APA, 2013; Skodol et al., 2013). According to Skodol and colleagues, much can be gained by “comparing the models to each other and to other models with respect to reliability and antecedent, concurrent, and predictive validity” and since the alternative model has already started to show promise, it may influence future editions of the DSM.

### **1.1.2 Diagnostic Features DSM-5 Section II**

According to the APA (2000, 2013), in order for an individual to meet a diagnosis of BPD, he/she must first meet the general criteria for a personality disorder (see Table 1), and then the criteria specified for Borderline Personality Disorder. A personality disorder is a continuing pattern of emotional and behavioural characteristics that deviate greatly from the individual's own societal and cultural expectations. This pattern associated with personality disorders is non-flexible and long-lasting for the most part, and often leads to severe distress and/or impairment (APA, 2000, 2013).

The fifth edition of the Diagnostic and Statistical Manual of Mental Disorders notes that in order to meet a personality disorder diagnosis, a person must manifest the above mentioned pattern in at least two of the following areas: cognition, affectivity, interpersonal functioning, and/or impulse control. Also stated in the DSM-5, the most recognizable features of BPD are enduring patterns of instable personal relationships, problems with self-image, self-esteem, difficulties with affect regulation, and impulsivity. These patterns usually appear in early adulthood and are typically observed in a variety of settings and situations. Nine relevant criteria are listed in the DSM-5, and at least five must be met for a valid diagnosis of BPD (see Table 2 for full diagnostic criteria).



**Table 1.** *DSM-5 (Section II) General Diagnostic Criteria for Personality Disorder*

- 
- A. An enduring pattern of inner experience and behavior that deviates markedly from the expectations of the individual's culture. This pattern is manifested in two (or more) of the following areas:
- (1) cognition (i.e., ways of perceiving and interpreting self, other people, and events)
  - (2) affectivity (i.e., the range, intensity, lability, and appropriateness of emotional response)
  - (3) interpersonal functioning
  - (4) impulse control
- B. The enduring pattern is inflexible and pervasive across a broad range of personal and social situations.
- C. The enduring pattern leads to clinically significant distress or impairment in social, occupational, or other important areas of functioning.
- D. The pattern is stable and of long duration and its onset can be traced back at least to adolescence or early adulthood.
- E. The enduring pattern is not better accounted for as a manifestation or consequence of another mental disorder.
- F. The enduring pattern is not due to the direct physiological effects of a substance (e.g., a drug of abuse, a medication) or a general medical condition (e.g., head trauma).
- 

Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, American Psychological Association (2013).

**Table 2.** *DSM-5 (Section II) Diagnostic Criteria for BPD*

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BPD is manifested by a pervasive pattern of instability of interpersonal relationships, self-image, and affects, and marked impulsivity beginning by early adulthood and present in a variety of contexts, as indicated by five (or more) of the following:

1. Frantic efforts to avoid real or imagined abandonment. Note: Do not include suicidal or self-mutilating behavior covered in Criterion 5.
  2. A pattern of unstable and intense interpersonal relationships characterized by alternating between extremes of idealization and devaluation. This is called "splitting."
  3. Identity disturbance: markedly and persistently unstable self-image or sense of self.
  4. Impulsivity in at least two areas that are potentially self-damaging (e.g., spending, sex, substance abuse, reckless driving, binge eating). Note: Do not include suicidal or self-mutilating behavior covered in Criterion 5.
  5. Recurrent suicidal behavior, gestures, or threats, or self-mutilating behavior.
  6. Affective instability due to a marked reactivity of mood (e.g., intense episodic dysphoria, irritability, or anxiety usually lasting a few hours and only rarely more than a few days).
  7. Chronic feelings of emptiness.
  8. Inappropriate, intense anger or difficulty controlling anger (e.g., frequent displays of temper, constant anger, recurrent physical fights).
  9. Transient, stress-related paranoid ideation or severe dissociative symptoms.
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Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, American Psychological Association (2013).

### **1.1.3 Diagnostic Features for Personality Disorders DSM-5 Section III (Alternative Model)**

The lasting patterns exhibited in various areas of everyday life (including social and personal contexts) that are associated with the way we perceive, relate, and think about everything that surround us and ultimately ourselves are known as personality traits (APA, 2013). Personality traits tend to be consistent across situations and across time. When personality traits begin to cause significant subjective distress, or when they become inflexible, maladaptive and start to cause significant impairment in an individual's life, then the existence of a personality disorder must be considered. A personality disorder is a continuing pattern of emotional and behavioural characteristics that deviate greatly from that of an individual's own societal and cultural expectations. Patterns associated with personality disorders are non-flexible and long-lasting for the most part, and often lead to severe distress and/or impairment (APA, 2000, 2013). The DSM-5 notes that in order to meet a personality disorder diagnosis, a person must manifest these patterns in at least two of the following areas: cognition, affectivity, interpersonal functioning, and/or impulse control (see Table 3 for full diagnostic criteria). One of the main differences of the proposed alternative approach to personality disorders in the DSM-5 (when compared to the current method of diagnosing) is that it retained only six personality types (instead of the 10 categorical types listed in Section II and previously in the DSM-IV-TR); BPD is included nonetheless. According to this approach, levels of personality functioning (Criterion A) and pathological personality traits (Criterion B) are the main characteristics of personality disorders, and a diagnosis requires determinations in both areas (APA, 2013). In addition, pervasiveness and stability (Criterion C and Criterion D), and alternative explanations for personality pathology (Criteria E, F, and G) must also be considered as appropriate. Regarding the evaluation of the level of personality in self and interpersonal functioning (Criterion A), it is considered that difficulties in any of these two areas of functioning constitute the "core of personality psychopathology". Furthermore, according to the guidelines of the alternative model, when the level of functioning is impaired the presence of a personality disorder must be considered. At least a moderate level of impairment in personality functioning is essential for a diagnosis of a personality disorder. The

assessment in both areas included in Criterion A is performed on a continuum where identity (the sense of a person as an individual) and self-direction (relating to the appropriate pursuit of short and long term goals) account for self-functioning, and empathy (the ability to understand other person's experiences and motivations) and intimacy (the ability to connect with others at a meaningful level) account for interpersonal functioning. Pathological personality traits (Criterion B) were derived from existing models of personality first and refined through research with users of mental health services. According to the APA (2013), all trait facets are "based on meta-analytic reviews and empirical data on the relationships of these traits to DSM-IV personality disorder diagnoses". The DSM-5 lists 25 specific traits organised into five specific domains (negative affectivity, detachment, antagonism, disinhibition, and psychoticism). All but one specific domain (psychoticism) are relevant to BPD. Pervasiveness and stability (Criteria C and D), relate to symptomology similar to that of a personality disorder that may be better explained by another disorder, effects of drugs, human development, and/or a medical condition. It is important to restate that the diagnostic thresholds, the criteria composition, and decision rules specified in this section of the DSM-5 are based on empirical and clinical evidence (Skodol et al., 2013).

#### **1.1.4 Diagnostic Features for Borderline Personality Disorder DSM-5 Section III (Alternative Model)**

In addition to meeting the above stated criteria for a personality disorder, the following criteria must also be met for a BPD diagnosis. First, at least a moderate impairment in personality functioning in two or more of the next four areas: identity, self-direction, empathy, or intimacy. And second, four or more of the following personality traits must be present: emotional lability, anxiousness, separation insecurity, depressivity, impulsivity, risk taking, or hostility (See Table 4 for full diagnostic criteria).

**Table 3.** *DSM-5 (Section III) Alternative General Diagnostic Criteria for Personality Disorder*

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**General Criteria for Personality Disorder**

The essential features of a personality disorder are

- A. Moderate or greater impairment in personality (self/interpersonal) functioning.
- B. One or more pathological personality traits.
- C. The impairments in personality functioning and the individual's personality trait expression are relatively inflexible and pervasive across a broad range of personal and social situations.
- D. The impairments in personality functioning and the individual's personality trait expression are relatively stable across time, with onsets that can be traced back to at least adolescence or early adulthood.
- E. The impairments in personality functioning and the individual's personality trait expression are not better explained by another mental disorder.
- F. The impairments in personality functioning and the individual's personality trait expression are not solely attributable to the physiological effects of a substance or another medical condition (e.g., severe head trauma).
- G. The impairments in personality functioning and the individual's personality trait expression are not better understood as normal for an individual's developmental stage or sociocultural environment.

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Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, American Psychological Association (2013).

**Table 4.** *DSM-5 (Section III) Alternative Diagnostic Criteria for BPD*

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**Proposed Diagnostic Criteria**

A. Moderate or greater impairment in personality functioning, manifested by characteristic difficulties in two or more of the following four areas:

1. **Identity:** Markedly impoverished, poorly developed, or unstable self-image, often associated with excessive self-criticism; chronic feelings of emptiness; dissociative states under stress.
2. **Self-direction:** Instability in goals, aspirations, values, or career plans.
3. **Empathy:** Compromised ability to recognize the feelings and needs of others associated with interpersonal hypersensitivity (i.e., prone to feel slighted or insulted); perceptions of others selectively biased toward negative attributes or vulnerabilities.
4. **Intimacy:** Intense, unstable, and conflicted close relationships, marked by mistrust, neediness, and anxious preoccupation with real or imagined abandonment; close relationships often viewed in extremes of idealization and devaluation and alternating between overinvolvement and withdrawal.

B. Four or more of the following seven pathological personality traits, at least one of which must be (5) Impulsivity, (6) Risk taking, or (7) Hostility:

1. **Emotional lability** (an aspect of **Negative Affectivity**): Unstable emotional experiences and frequent mood changes; emotions that are easily aroused, intense, and/or out of proportion to events and circumstances.
2. **Anxiousness** (an aspect of **Negative Affectivity**): Intense feelings of nervousness, tenseness, or panic, often in reaction to interpersonal stresses; worry about the negative effects of past unpleasant experiences and future negative possibilities; feeling fearful, apprehensive, or threatened by uncertainty; fears of falling apart or losing control.
3. **Separation insecurity** (an aspect of **Negative Affectivity**): Fears of rejection by and/or separation from—significant others, associated with fears of excessive dependency and complete loss of autonomy.
4. **Depressivity** (an aspect of **Negative Affectivity**): Frequent feelings of being down, miserable, and/or hopeless; difficulty recovering from such moods;

pessimism about the future; pervasive shame; feelings of inferior self-worth; thoughts of suicide and suicidal behavior.

5. **Impulsivity** (an aspect of **Disinhibition**): Acting on the spur of the moment in response to immediate stimuli; acting on a momentary basis without a plan or consideration of outcomes; difficulty establishing or following plans; a sense of urgency and self-harming behavior under emotional distress.
6. **Risk taking** (an aspect of **Disinhibition**): Engagement in dangerous, risky, and potentially self-damaging activities, unnecessarily and without regard to consequences; lack of concern for one's limitations and denial of the reality of personal danger.
7. **Hostility** (an aspect of **Antagonism**): Persistent or frequent angry feelings; anger or irritability in response to minor slights and insults.

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Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, American Psychological Association (2013).

#### 1.1.5 Prevalence

Borderline Personality Disorder is the most prevalent of the personality disorders in clinical populations, and is one of the most severe and difficult psychiatric disorders to treat (Seligman, 1998). The APA (2000) estimates the prevalence of BPD to be about two percent in the general population, ten percent for psychiatric outpatients, and between thirty to sixty percent for psychiatric inpatients, with females outnumbering males at a rate of 3:1. However, the higher prevalence among women has been disputed and, according to Brinks, Fenton, McCarthy, Lee, Adams and Duggan (2006), there is no real evidence that BPD is more prevalent among females. In addition, the risk of BPD among first-degree biological relatives is five times higher than among people in the general population (APA, 2000).

#### 1.1.6 Course of the BPD

The course of BPD varies greatly from case to case (APA, 2000) and it appears less stable than what is expected for other personality disorders (Skodol et al., 2005; Zanarini, Frankenhurh, Hennen, Reich, & Silk, 2006). A pattern of chronic

instability is usually expected in early adulthood during which affective outbursts and severe impulsivity are common (APA, 2000). The problems posed by patients with BPD are well documented and include low treatment compliance, high hospitalization rates, and poor treatment outcomes (Linehan, 2000). Suicide attempts, aggression, self-mutilation, drug addiction, bouts of depression and anxiety are commonly associated with this disorder (Van Asselt, 2008). Estimates indicate that up to 75 percent of those diagnosed with BPD engage in self-harming behavior with self mutilation and suicide attempts being the most prevalent. Suicide rates among patients with BPD are 50 times higher than in the general population (Posner, et al., 2002). The risk of suicide appears to be higher in early adulthood and gradually decreases with age (APA, 2000). Borderline Personality Disorder is also associated with impaired social and occupational functioning (Skodol et al., 2002). According to the APA (2000), follow-up studies have found that the symptoms in as many as fifty percent of BPD patients who have received treatment (regardless of the type of treatment) tend to subside after just 10 years after initial treatment; and while the remission of symptoms varies from one person to the other, a BPD diagnosis is no longer met in most cases. Nevertheless, it is important to note that while a BPD diagnosis may no longer be met, many of the BPD symptoms tend to remain through a person's lifespan.

## **1.2 Attachment**

Attachment is thought to be an important aetiological contributor to development of BPD and personality disorders in general (Timmerman & Emmelkamp, 2006). According to Bowlby, attachment is “any form of behaviour that result in a person attaining or retaining proximity to some other differentiated and preferred individual” (Bowlby, 1977). It is an affective connection that starts to develop between an infant and a primary caregiver soon after birth (Bowlby, 1973).

### **1.2.1 Attachment Theory**

Attachment theory is the product of the combined work of John Bowlby and Mary Ainsworth (Ainsworth & Bowlby, 1991). While Bowlby laid out the basic tenets of



the theory, Ainsworth expanded on his ideas and developed methods for testing and further investigating those ideas (Bretherton, 1992). Bowlby first proposed his theory of attachment in the 1950s (Meredith, Ownsworth, & Strong, 2008). Drawing heavily on Lorenz's imprinting work and Harlow's animal attachment behaviour studies, Bowlby noted that since human and other infant mammals are incapable to survive on their own, as they cannot feed and protect themselves, they need to depend on a "differentiated and preferred individual who is usually conceived as stronger and wiser" to satisfy their basic biological needs. Hence, he postulated attachment as a biologically-based adaptive behaviour that enhances an infant's chance of survival (Bretherton, 1992). According to Bowlby, one of the main functions of attachment is to regulate "proximity" in order to enable the formation of a close bond between an infant and an attachment figure. He hypothesized that the quality of the attachment develops over time and is partly determined by the quality of the relationship between the infant and the caregiver, and by the caregiver's individual attachment style characteristics. Even though attachment is more distinguishable during childhood, it influences human behaviour through the lifespan (Ainsworth & Bowlby, 1991; Bowlby, 1958; Bretherton, 1992). It is important to note that while the use of terms such as infant /child, and mother are prevalent in the attachment literature, attachment also applies to adults and to figures other than the mother.

Attachment is regulated by a "motivational control" or "behavioural" system that organises and regulates a child's behaviour and balances his/her need to explore the environment and to seek comfort from his/her care giver(s) (Bowlby, 1977). The ultimate goal of this system is to facilitate survival and procreation (Ainsworth & Bowlby, 1991). In addition to attachment behaviour, Bowlby postulated other types of behaviour, two of which are relevant to this thesis: exploration and care-giving. Bowlby noted that exploration (which is notable in infants of many species) is essential to our survival since exploring our environment is necessary in order for us to build an accurate mental picture of our surroundings. While exploration is a type of behaviour opposite to attachment, both behaviours are needed and are a typical characteristic of "healthy" individuals (Bowlby, 1973, 1977, 1982). As for care-

giving, Bowlby considered it to be behaviour complementary to attachment. Care-giving, he stated, is related to the availability and responsiveness on the part of the parent (or caregiver) to the infant in a moment of need. He noted this role is often replayed in many different situations in a person's everyday life and throughout a person's lifespan (e.g., psychotherapy where the psychotherapist assumes the role of the caregiver). In addition, Bowlby also suggested care-giving, depending on how it is delivered by the caregiver, may have a great influence on a person's mental health development (Bowlby, 1977, 1988).

### **1.2.2 Internal Working Models**

Bowlby (1973) hypothesized that early experiences lead to the construction of "internal working models" that serve as guiding prototypes for future thoughts, behaviours and feelings. According to Bowlby, internal working models are considered to be necessary for the existence of the most complex behaviours including attachment. Hence, only "organisms" that have developed the capacity to create internal working models are able to exhibit such complex behaviours; the more advanced the organism, the more likely it is to accurately foresee the future. He also noted that inaccurate working models of the environment and/or self perceptions have the potential to lead to problems in pathological functioning (Bretherton, 1992). Specifically, Bowlby hypothesized the storing of working models of attachment starts at an early age enabling children to differentiate between safe and dangerous environments, and at the same time, allowing them to store important information regarding relationships which will eventually guide their future thoughts, emotions, and behaviour. It is through these relationships with primary caregivers that children first start to develop internal working models of attachment patterns that will eventually allow them to predict and adjust their response to their caregivers' possible behaviours. Bowlby argued that children who manage to develop an internal working model in which they feel valued by their caregivers and rely on them, are children whose parents were able to tend to their basic needs for food, comfort, and shelter effectively, and at the same time provided them with a safe base from which they were able to explore their environment (Bowlby, 1969). Conversely, children who were stopped from exploring their

environment and those who experienced constant rejection from caregivers in their attempts to obtain comfort are likely to form an internal working model of inadequacy and a lack of self-worth (Bowlby, 1977, 1988). Additionally, Bowlby argued that as the child develops, he/she continues to re-shape mental representations of their secure base taking into account past experiences with caregivers and environment and integrating new experiences at the same time (Waters, Crowell, Elliot, Corcoran, & Treboux, 2002). Mary Ainsworth furthered Bowlby's ideas of attachment and safe-based behaviours by empirically observing and assessing the effects of maternal presence and absence on children's behaviour (Bretherton, 1992).

### **1.2.3 Patterns of Attachment (Childhood Attachment)**

Ainsworth (1970) developed the "Strange Situation Paradigm", a thirty-minute procedure consisting of interactions and situations of proximity, separation and exploration involving a mother, a child, and a stranger. Ainsworth identified three distinct patterns of attachment which she classified as 'secure', 'insecure-ambivalent', and 'insecure avoidant.' According to Ainsworth, secure attachment is the healthiest form of attachment. She noted children with a secure attachment pattern displayed well-balance behaviour that alternated between closeness to the attachment figure and exploration of the environment when their mothers were present. When separated from the mother, these children showed moderate distress, but gave their mother a warm welcome when reunited. Most children involved in Ainsworth's initial study displayed a secure pattern of attachment. Insecure-ambivalent children avoided exploration and appeared overly dependent on their mothers while present. During separation these children became especially upset as their mothers were leaving. However, at reunion, these children showed anger and "ambivalent" behaviours such as wanting to be picked up and soothed by their mothers, but pushing them away soon afterwards. Insecure-avoidant children had no problem exploring their environment with or without the presence of their mothers and showed no distress during separation. At reunion these children showed no emotion and continued as they were while ignoring their mothers (Ainsworth, Blehar, Everett, & Wall, 1978). According to Ainsworth (in Bartholomew &

Horowitz, 1991), the degree to which a child relies on his/her caregiver as a source of security is reciprocal to the quality of the early attachment relationship.

A fourth pattern of attachment, 'insecure-disorganised', was later identified by Main and Solomon (1990) while utilising Ainsworth's Strange Situation Paradigm. Children under this classification became extremely distressed during separation. At reunion however, these children did not appear to have a defined set of behaviours to deal the impending situation, and seemed "disorganised", confused, and in some cases, children became "frozen" not knowing what to do (Van Ijzendoorn & Bakermans-Kranenburg, 2003). Main and Solomon hypothesized that disorganised children may view their mother or primary caregiver as "frightening" or "frightened" (Hesse & Main, 2000). Childhood maltreatment has been associated with this pattern of attachment (Carlson, Cicchetti, Barnett, & Braunwald, 1989). Research suggests disorganised attachment may play an important role in the development of mental disorders (Meredith, Ownsworth, & Strong, 2008).

#### **1.2.4 Adult Attachment**

Attachment patterns are initially the result of the parent-child relationship; consequently, in this context at least, they are thought to be relationship-specific. The development of this relationship allows for the formation of unique attachment patterns between the mother and child, and the father and child (or other available caregivers) which could differ significantly between them (Steel, Steel, & Fonagy, 1996). This relationship-specific interaction is temporary nevertheless. Bowlby noted that as the infant develops and his/her internal working models become more complex, attachment patterns become less relational-specific and gradually integrate with a person's individual characteristics, which in turn start to play an increasingly significant role in the person's view of him/herself and others and will directly influence future attachment relationships (Bowlby 1973; 1988). Hence, the more internal working models intertwine with attachment relationships, the more important an individual's perception of the relationship becomes. According to Bowlby, this shift becomes noticeable by late adolescence and is fully formed by early adulthood (Bowlby, 1973).

Building on Bowlby's idea that attachment patterns in late adolescent and adulthood reflect internal working models of self and others, Bartholomew (1990) defined four distinct patterns of adult attachment: secure, preoccupied, dismissing, and fearful. According to Bartholomew and Horowitz (1991) working models of self can be either positive (the self is deserving of love and attention) or negative (the self is undeserving of love and unworthy of attention). Likewise, working models of others can also be seen as positive (others are perceived to be loving, accepting, and caring), or negative (others are perceived to be unreliable, rejecting and uncaring). The working models of the self are associated with either a high or low degree of anxiety and dependency related to how close relationships are perceived. Working models of others are associated either seeking or avoiding closeness in relationships based on how others have been internalized by the individual (Griffin & Bartholomew, 1994). According to this conceptualization of adult attachment, a secure pattern of attachment, which is generally accepted to be the most functional and adaptive form of attachment, is characterized by a positive sense of self and others, a low level of anxiety, and a low level of avoidance behaviour. Also, securely attached individuals are likely to display a high degree of self-worth and a tendency to seek and feel comfortable in close relationships with others. A fearful pattern of attachment on the other hand is characterized by a negative sense of self and others, a high level of anxiety, and a high level of avoidance behaviour. Preoccupied attachment is marked by a negative sense of self and a positive sense of others, a high level of anxiety, and a low level of avoidance. Dismissing attachment is marked by a positive sense of self and a negative sense of others, and high sense of avoidance.

Despite the significant differences in the conceptualisation of childhood attachment and adult attachment, it is important to note the following: first, both childhood and adult attachment are expected to change if an individual is presented with major life stressors that disconfirm his/her existing working models. Second, there is enough evidence to suggest that, for the most part, attachment patterns tend to remain stable across the lifespan (Scharfe & Bartholomew, 1994). And third, both childhood attachment and adult attachment are rooted on the same core principles of attachment theory (Hazan & Shaver, 1990, 1994; Fraley & Shaver, 2000). The core principles

of attachment theory have been described as follow: First, even though humans are biologically predisposed to form attachment relationships, the process through which this is accomplished is shaped by interpersonal relationships and learning experiences. Second, attachment relationships formed in childhood (i.e. child-caregiver) are similar to the attachment relationships formed in adulthood (e.g. romantic relationships). Next, working models are applicable to childhood attachment as well as adult attachment; and even though working models are susceptible to change, they tend to remain stable over time. And last, insecure working models and attachment styles do play a role, even if minimal, in a number of mental disorders in childhood as well as in adulthood, and they also play a role in the quality of relationships with others (Fraley & Shaver, 2000; Rholes & Simpson, 2004).

#### **1.2.5 Attachment and BPD**

Even though there is disagreement regarding the relationship between a specific type of attachment and BPD, a strong association between general insecure attachment (any attachment other than secure) and BPD is now generally accepted in the empirical literature (Agrawal, Gunderson, Holmes, & Lyons-Ruth, 2004). As previously stated, Bowlby (1969) postulated several types of behaviour which are normally exhibited by humans, and primates in general, including exploration, care-giving, and attachment behaviours which are essential for the construction of internal working models. He also postulated other types of behaviour including proximity seeking, smiling, and clinging which are also necessary to the development of internal working models. According to Bowlby, it is through the interaction and expression of these behaviours that infants evoke care-taking responses in adults which ultimately lead to the creation of an emotional bond or attachment relationship between them (Bowlby, 1969, 1977). In turn, this emotional bond/attachment relationship will result in the construction of internal working models which may or may not be an accurate representation of the environment. Inaccurate representations of the environment have the potential to lead to pathological functioning (Bretherton, 1992). This view is supported by Fonagy and colleagues (1996) who suggested that caregivers who have developed an accurate perception of their environment (world,

themselves and others) are likely to transfer that same perception and at the same time a sense of security to their children. In contrast, individuals with an inaccurate perception of their environment are also likely to transmit their skewed thoughts, feelings, behaviours, a general feeling of insecurity and unstable sense of self to their children.

Bateman and Fonagy (2006) hypothesized that a diminished capacity to accurately perceive one's environment "generate insecure and perhaps disorganized attachment", and at the same time accounts for many of the core symptoms of BPD. It is important to note however, that there is still a lack of consensus among researchers on the various types of insecure attachment often associated with features of BPD (NICE, 2009). One of the main reasons for the lack of agreement in the matter has to do with the many different types of attachment used by researchers and the various ways of measuring both attachment and BPD (Agrawal, Gunderson, Holmes, & Lyons-Ruth, 2004). Even so, it is still worth noting that some studies have found associations between unresolved insecure attachment (Fonagy et al., 1996; Barone, 2003; Patrick et al., 1994; Stalker & Davis, 1995), preoccupied insecure attachment (Patrick et al., 1994; Rosentein & Horowitz, 1996), and fearful insecure attachment (Brennan & Shaver, 1998; Fossati et al., 2001).

In a systematic review conducted by Agrawal and colleagues (2004), thirteen studies that evaluated types of attachment associated with the diagnosis of BPD or with the dimensional characteristics of BPD were examined. All thirteen studies found an association between a general type of insecure attachment and BPD. Seven of those studies used the Adult Attachment Interview (AAI) while the rest used a variety of self-report measures of attachment. According to Agrawal and colleagues, this highlighted one of the main problems in their systematic review, and also in contemporary research, which is a lack of standardization in the type of measures used and also in the types of attachment style researched. This is a significant problem as it limits and even sets back research. A related situation is the use of two distinct measuring approaches as some studies use a dimensional approach to the measure of attachment (attachment classified in a spectrum) while others used a

prototypic approach (belonging to one type of attachment or another, but not to both). In addition, while most self report measures were developed by social psychologists, the AAI was developed by developmental researchers, which is reflected on the different approach taken to the research of attachment. Specifically, the AAI is administered through an interview and relies in narrative on the part of the patient, while self-report measures rely on the participant's perception of his/her own upbringing. However, as before mentioned, both the social and the developmental approach are rooted on Bowlby's theory of attachment. An interesting finding of Agraval's review was that some of the BPD patients were categorized as secure (between 7% and 8%) when the AAI was used, and between 9% and 29% when self report measures were used. This finding was unexpected as most theories assume a high prevalence of insecure attachment among individuals with BPD and have a tendency to consider secure attachment as a protective shield against BPD features. In conclusion, while this review supported the association between a general type of insecure attachment and BPD, it also illustrated some of the main problems found in the attachment literature concerning BPD. Even though Agraval's review was conducted in 2004, it is still a good reflection of the field today.

#### **1.2.6 Parental Bonding**

As before noted, Bowlby (1973) believed that meaningful relationships are paramount to the development of internal working models. In turn, these working models become the mould for future perception, feelings, and behaviours that will play an essential role in all future relationships (Moreira et al., 2003). Even though a concrete definition of the term parental bonding does not exist, it is usually understood as the connection or the attachment relationship between the parent(s) or caregiver(s) and the child (Parker, Tupling, and Brown (1979). According to Parker and associates, a reciprocal relationship exists between the caregiver and the child that is influenced and shaped by the presenting characteristics of both parties (such as temperament in the part of the child, and psychological functioning and cultural beliefs in the part of the caregiver) that are of great influence to the attachment relationship. While the area of research into parental bonding is minimal when compared to the area of attachment, important to the present study is the notion that



studies have found associations between parental bonding and mental disorders including anxiety and mood disorders, drug and alcohol abuse and dependence, and personality disorders (Enns, Cox, & Clara, 2002; Russ, Heim, & Westen, 2003).

### **1.3 Metacognition/Mentalization/Theory of Mind**

The ability to recognize, attribute, and interpret the mental states (thoughts, beliefs, emotions, etc) of self and others is referred to as Theory of Mind (ToM; Lysaker, Dimaggio, Carcione, & Nicolo, 2007) mentalization (Bateman & Fonagy, 2008), or metacognition (Semerari, Carcione, Dimaggio, Nicolo, & Procacci, 2007). These are three overlapping cognitive processes (Gumbley, 2011) which are often interchangeable. Theory of Mind/mentalization/metacognition is the ability to understand our behaviour and that of others in terms of likely thoughts, beliefs, feelings, desires, etc (Bateman & Fonagy, 2006). This capacity of understanding provides a person with a basic sense and awareness of self as an individual and also as an emotional being (Bateman & Fonagy, 2004). The ability to understand other people's behaviour occurs mostly at the pre-conscious level and is crucial for the process of emotion regulation (Fonagy, Gergely, Jurist, & Target, 2004).

Fonagy (1998) hypothesized that the capacity to mentalize is a developmental milestone which is greatly determined by a child's early secure attachment relationship with parents or caretakers. It is generally assumed that the ability to read minds properly is necessary for successful social interactions and interpersonal relationships (Frith & Singer, 2008). This ability however, can be severely compromised when problems in the attachment relationship such as interpersonal trauma, rejection, neglect or other similar situations take place. Such situations, along with a possible biological predisposition, and perhaps other yet unknown variables, leave the child vulnerable to future failures in mentalization (Johnson, Cohen, Chen, Kasen, & Brook, 2006). Failures in mentalization may lead to regression to a non-mentalizing state (which is characterized by the unawareness of mental states of self and others) unless they present themselves in a concrete and physical way. Some of the most common problems during a non-mentalizing state are

unstable sense of self, impulsive behaviour, concreteness of thought, and affect dysregulation (Bateman & Fonagy, 2006).

According to Bateman and Fonagy (2006), most mental disorders can be considered disorders of mentalization. A number of studies conducted in the areas of autism and schizophrenia have investigated the relationship of social deficits and metacognition and social deficits and ToM (Arntz, Bernstein, Oorschot, & Schobre, 2009). The results of these studies suggest that deficits in metacognition/ToM play an important role in both disorders. Borderline Personality Disorder has not received the same attention however, but since individuals with BPD also struggle with social interactions and interpersonal relationships, the results of the studies above mentioned are thought to be relevant to BPD (Franzen et al., 2011). It is generally assumed that individuals afflicted by BPD have a lower capacity to interpret their own minds and the minds of others; thus their social and interpersonal relationships tend to be confusing and oftentimes chaotic. Moreover, it is believed that these deficits in mentalization play a key role in the development of complex mental disorders including BPD (Fonagy, Gergely, Jurist, & Target, 2004).

### **1.3.1 Mentalization and BPD**

Fonagy and colleagues developed a mentalized-based treatment for BPD which is geared to decrease individual deficits in mentalization about self and others (Eizirik & Fonagy, 2009). Mentalized Based Treatment (MBT), along with Dialectical Behavior Therapy (DBT), is one of the few treatments of BPD that has empirical support. In spite of this, recent studies have opened up the possibility that the role of mentalization in social interactions and interpersonal relationships is still not fully understood as it appears that individuals with BPD may have a higher capacity to mentalize about others than previously thought (Franzen et al., 2011). According to Bateman and Fonagy (2006) the key deficits associated with BPD include: impulsiveness, emotion regulation, relationship problems, and identity formation. They noted that these deficits may account for many, if not all problems in mentalization. According to Bateman and Fonagy, the inability to perceive the mental states of others accurately may potentially be the cause of the above

mentioned deficits. Thus, they labelled these deficits as “non-mentalizing modes of thinking”. To date however, the available empirical evidence neither support nor refute those claims. In consequence, it is important to investigate if the features typically associated with BPD and suspected aetiological factors are in fact mediated by mentalizing or non-mentalizing modes of thinking as well as the extent of these relationships as they play a crucial role in the overall well-being of individuals afflicted by BPD.

#### **1.4 Childhood Maltreatment**

Evidence suggests the effects of childhood maltreatment and neglect can interfere with all aspects of childhood development including physiological, cognitive, intellectual, behavioural, psychological, and emotional development (Sachs-Ericsson, Cromer, Hernandez, & Kendall-Tackett, 2009). The concept of childhood maltreatment or childhood abuse is understood as any form of physical, psychological and sexual mistreatment of a child that may contribute to the hindering of his/her emotional, physical, and/or psychological development (Norman, Byambaa, De, Butchart, Scott, & Vos, 2012). Four types of childhood abuse/maltreatment are generally recognised: sexual abuse, physical abuse, emotional/psychological abuse, and neglect (The National Society for the Prevention of Cruelty to Children, 2010; U.S. Department of Health and Human Services, Children’s Bureau, 2013). The known long term consequences of childhood abuse include impaired brain development, cognitive difficulties, social difficulties, and poor mental and emotional health (Child Welfare Information Gateway, 2013).

Childhood maltreatment has long been suspected to play a role in the aetiology of psychiatric disorders (Arnou, 2004). A research study into the effects of childhood abuse and lifetime psychopathology conducted by MacMillan et al. (2001) concluded that individuals who had been victims of childhood physical abuse reported a higher incidence of anxiety disorders, depression, antisocial and suicidal behaviour, and alcohol as well as drug abuse and dependence. In addition, MacMillan and colleagues found that mental disorders in general were more prevalent among individuals who had reported a history of sexual abuse in childhood. A

comprehensive review and meta-analysis conducted by Chen and colleagues (2009) concluded there was a strong association between childhood sexual abuse and a wide range of mental disorders including anxiety, depression, eating disorders, and sleep disorders. It is worth mentioning however that the focus of childhood abuse research has concentrated mainly in studying the effects of sexual abuse, and while some attention has been given to physical abuse, emotional abuse has been ignored for the most part (MacMillan et al., 2001). Chen and colleagues reported that despite the likelihood of under-reporting, which is often suspected when dealing with sexual abuse, the prevalence of sexual abuse for patients seeking general medical care were between 4% and 21% for adults, and between 3% and 33% for children (Chen et al., 2009). Similarly, using a sample of 8667 adult members of a Health Maintenance Organization (HMO) to investigate the relationship between multiple forms of childhood maltreatment and adult mental health, Edwards, Holden, Felitti, and Anda (2003) reported the prevalence of childhood maltreatment as follow: Sexual abuse (21%), physical abuse (20%), and witnessing maternal violence (14%). The researchers also reported that almost thirty-five percent of the participants reported to have endured more than one type of abuse in childhood. Additionally, Edwards and colleagues reported a positive correlation between scores indicating mental health problems and childhood maltreatment. They also noted that participants who had endured the higher number of maltreatment types in childhood presented with the higher number of mental health related symptoms.

Research in brain development has found evidence that childhood abuse may inhibit cognitive pathways and the development of regions of the brain associated with emotion regulation (Heim & Nemeroff, 2002; Perry, Pollard, Blakely, Baker, & vigilante, 1995). If areas associated with emotion regulation are not fully developed in a child, it is expected that he/she will have a lack of empathy, experience behavioural and emotional difficulties, and may find it difficult to socialise (Shore, 1997). Developmental differences have been found in abused children when compared to children who were raised in abuse free environments. A study conducted by Beeghly and Cicchetti (1994) found that even though abused children had a similar capacity to develop receptive language as children who did not have

history of abuse, they were more likely to have difficulties in developing productive language, reflecting, and social adjustment.

According to Fonagy and Target (1997) evidence has shown that children who have been victims of abuse may have difficulty developing a full capacity to mentalize and may also be more likely to have a poor sense of self. Furthermore, they argue, the partial impairment in mentalization tends to be more prevalent among abused children than in children with insecure attachments. Although, it should be mentioned that disturbances in the attachment process are believed to be one of the many consequences of childhood maltreatment and neglect. Disturbances in the attachment process have been linked to a child's inability to regulate emotions, cope with stress, and a general failure to create social bonds (Lowenthal, 2000).

It is also important to note however that the childhood maltreatment literature has several limitations. First, a high percentage of research studies have used participants from homogeneous populations (e.g. prison inmates, specific clinical populations, etc.). Second, most participants tend to come from a lower socioeconomic status, and third, there has been an over-reliance in self-reporting and the use of official records. And while the effects of childhood abuse appear to be clear, not all victims of abuse will experience the same symptoms, or as in many cases, the victim may not experience symptoms at all (Goldman, Salus, Wolcott, & Kennedy, 2003).

#### **1.4.1 Childhood Abuse and BPD**

Childhood abuse has long been suspected to be an aetiological factor in the development of BPD (Lobbestael & Arntz, 2010). Several studies have found a relationship between BPD and sexual and emotional abuse in childhood (Battle et al., 2004) rather than abuse later in life (Waller, 1994). Childhood maltreatment has also been associated with problems in the development of emotion regulation (which is believed to play an essential role in the development of BPD) in adolescents and adults (Messman-Morre, Walsh, & DiLillo, 2010). In a study conducted by Specht, Chapman, and Cellucci (2009) with incarcerated females diagnosed with BPD, the

severity of BPD was found to be correlated with physical and emotional abuse in childhood. It is important to note however, that women with BPD tend to report childhood abuse more than males. It has been assumed that the reason for this is related to gender differences, but there is not enough empirical evidence behind this assumption (Johnson et al., 2003).

It is important to mention the close relationship that exists between BPD symptoms and early childhood trauma. An empirical review conducted by Zanarini (2000) found the rates of childhood sexual maltreatment among individuals diagnosed with BPD between 40 and 70 percent. Likewise, an empirical review conducted by Graybar and Boutilier (2002) which included various types of trauma found even higher rates of childhood maltreatment (between 60 and 80 percent) among participants diagnosed with BPD. Because of this close relationship between BPD and maltreatment it could be inferred that the symptoms BPD may in fact be a description of the impact of severe abuse. However, as stated in the National Institute for Health and Clinical Excellence (NICE, 2009) clinical practice guideline on the treatment and management of BPD, “abuse alone is neither necessary nor sufficient for the development of borderline personality disorder”.

According to the psychosocial view of BPD, any environment in which sexual, physical, and/or emotional abuse is prevalent can be considered an invalidating environment (Wagner & Linehan, 1999). According to Linehan (1993), in the case of childhood abuse, the type of abuse, duration, and the degree of the abuse a person experiences are all very relevant since it may have an impact on the number and severity of symptoms a person exhibits. For example, in the case of BPD sexual abuse is considered to be an extreme type of abuse that has been found to be a better predictor of BPD traits than emotional abuse. In the case of invalidating environments however, even milder forms of invalidation are thought to have an impact in the development of BPD. According to Wagner and Linehan (1999) an invalidating environment is usually characterized by punishment, coercion, criticism, minimization, etc. The most important features of this type of environment are the disqualification of the child’s experiences and responses by his/her caretakers and the high value placed on self-control and self-reliance. Specifically, as noted by Linehan

(2000), failure on the part of the child to comply with what is expected is interpreted as a lack of character, lack of motivation, or any other number of negative characteristics. Conversely, when the child complies with what is expected, no positive reinforcement or validation is provided. Growing up in an invalidating environment can have serious consequences that may have a negative impact on a person's present and future development. One of the main consequences, which is of relevance and importance to this study, are problems with emotion regulation as the children growing up in these types of environments are not taught to modulate emotional arousal. In turn, struggles with emotion regulation lead to other problems including a low tolerance to distress, inability to trust own emotional responses, and a tendency to invalidate own internal, personal, and social experiences. Problems with emotion regulation can severely hinder appropriate development (Crowell, Beauchaine, & Linehan, 2009). Not surprisingly growing up in an invalidating environment has also been associated with a number of mental disorders including schizophrenia, anxiety, substance abuse, and depression (Linehan, 2000). Nevertheless, it is important to note that while BPD is often mentioned in the literature in relationship to invalidating environments, there is still not enough empirical evidence to support Linehan's assertions and more research is needed in the subject before specific conclusions can be made (Cheavens et al., 2005).

As before stated, childhood maltreatment is believed to be an aetiological factor in the development of BPD, but it is not the only factor. Other factors may include childhood ADHD (Carlotta, Borrini, Maffel, & Fossati, 2013), executive functioning mechanisms (Gvirtz, Harari, Braw, Shefet, Shamay-Tsoory, & Yechiel Levkovitz, 2012), emotion dysregulation (Stepp, Scott, Morse, Nolf, Hallquist, & Pilkonis, in press), etc.

#### **1.4.2 Neglect**

The role of adverse childhood experiences including abuse and neglect in personality disorders and particularly in BPD can hardly be disputed (Battle et al., 2004). However, contrary to the case of any of the three forms of abuse investigated in this study, neglect does not have a universally accepted definition (Dubowitz, 2007;

Dubowitz, Black, Starr & Zuravin, 1993; Friedman & Billick, 2014). While some researchers argue that neglect is and should be considered on the same category as childhood abuse “one and the same”, others argue that neglect is conceptually different (Friedman & Billick, 2014). Hence, it is difficult to dispute the argument that it is perhaps the lack of a clear conceptual definition what has hold back neglect as it has impeded the construction of operational definitions and in consequence the development of valid and reliable measures (Dubowitz et al., 2005). This situation is further complicated by the fact that there is agreement among researchers regarding the multi-dimensionality of neglect (Baker & Festinger, 2011).

In an attempt to provide “empirical support for conceptual definitions of child neglect” made by Dubowitz and colleagues (2005), several conceptual issues were identified in the neglect literature including: parental versus child focus, a lack of clarity on what constitutes neglect, the heterogeneity of neglect, actual versus potential harm, etc. These issues, according to Dubowitz and colleagues, make it extremely difficult to reach consensus regarding a working definition of neglect. To add to the problem, as noted by Mennen, Kim, Sang, and Trickett (2010), much of the available empirical literature has used legal definitions of neglect which can vary from state to state in the US, and from country to country. Perhaps a more significant difficulty in the study of neglect is the fact that it is controversial. For instance, what is considered neglect in some cultures is seen as normal in others (Friedman & Billick, 2014). Hence, there is concern that some cultures may be singled out and treated unfairly. Likewise, since low socio-economic status, education, and family composition have been identified as risk factors for increased child neglect in a few studies, it has been argued that this may open the door to the unfair treatment of parents and families in such circumstances (McCoy & Keen, 2009).

Taking into consideration that childhood abuse has been vastly researched and has long been well established; and at the same time considering the many difficulties associated with the study of neglect, the decision to exclude neglect from this study was taken.



## **1.5 Emotion Regulation**

The results of the systematic review which is presented in Chapter 2 suggest that the study of emotion regulation may advance the understanding of internal working mechanisms of relationships involving mental disorders including BPD. The results also indicated that there was evidence to suggest that emotion regulation plays a mediating role in psychopathology. The role of emotion regulation suppression in particular appeared to be of significance. It should be noted however that the evidence was not conclusive and further research is needed.

Due to the lack of an empirically validated classification of emotional regulation strategies, one of the many difficulties of embarking on a study involving emotion regulation is deciding what strategies to concentrate on (Koole, 2009). When faced with this dilemma, Gross and colleagues (1998; 2001) developed a model which is currently considered the most viable and comprehensive model of emotion regulation (Koole, 2009). For this reason, emotion regulation reappraisal, and emotion regulation suppression will be the primary focus of this study since both strategies are the foundation of Gross' process model of emotion regulation.

Given that emotional difficulties are often involved in processes associated with various forms of psychopathology, it is of the utmost importance to have a healthy ability to regulate our affect (Gross, 2004). Affect regulation is understood as "the purposeful alteration of one's current affective state" (Bonanno, 2001). It is a broad construct accounted by several "subordinate" constructs, one of which is emotion regulation (Gross and Thompson, 2007). Affect regulation, according to the developmental view of emotion, is composed of four overlapping constructs: coping, psychological defences, mood regulation, and emotion regulation (Rottenberg & Gross, 2007). The main role of coping is to reduce negative affect and it normally takes place over long periods of time (e.g. coping with bereavement). Coping is usually activated by specific objects rather than by the experience of emotions. Similarly, the main role of psychological defences is to reduce and regulate hostile behaviour and/or sexual impulses associated with negative affect at an unconscious and automatic level (Gross & Thompson, 2007). Mood regulation on the other hand

is involved in the alteration of emotional experiences; however, it has little to do with the regulation of emotional behaviour (Larsen, 2000). Emotion regulation is perhaps the most complex of all the affect regulation sub-constructs as it involves changes in the emotion mechanism as well as behavioural alterations (Gross, 2002). Emotion regulation has been defined and constructed in many different ways, but for the most part, the general consensus is that it involves either over (up) or under (down) regulation of emotions (Rottenberg & Gross, 2007). According to Gross, emotion regulation refers to the various mechanisms through which humans regulate emotions; specifically, “the process by which individuals influence which emotions they have, when they have them, and how they experience and express these emotions” (Bloch, Moran, & Kring, 2009).

There are two types of emotion regulation strategies that have been found to be particularly relevant in psychopathology. These fall into two categories: strategies that have been hypothesized to be protective against mental health problems, and strategies that are considered to be risk factors for psychopathological issues. Explicitly, while emotion regulation reappraisal, problem solving, and acceptance strategies are believed to decrease the likelihood of developing a mental disorder; emotion regulation suppression, avoidance, and rumination are considered to increase the risk (Aldao, Nolen-Hoeksema, & Schweizer, 2010; Gross, 1998; Gross, 2002; Gross & Thompson, 2007; John & Gross, 2004).

Problem solving is the conscious process by which an individual strives to find effective and adaptive solutions in order to change stress provoking situations encountered in everyday life (Nezu, 2004). Problem solving can also be conceptualized as the process, behaviour, or actions geared toward resolving a problem such as changing the meaning of a situation, or changing how one reacts to that situation (D’Zurilla, Nezu, & Maydeu-Olivares, 2004). It is important to note however that problem solving skills do not regulate emotion; yet, these skills may influence emotion regulation by diminishing levels of stress through modification or elimination of stressors (Aldao, Nolen-Hoeksema, & Schweizer, 2010). Conversely, the lack of problem solving skills has been hypothesized to play a role in the

development of depression, anxiety, and eating disorders (Chang, Downey, & Salata, 2004; D'Zurilla, Chang, Nottingham, & Faccinni, 1998; VanBoven & Espelage, 2006). Hence, it is not surprising that teaching and practicing problem solving skills have been incorporated into cognitive behavioural treatments for the mental disorders above mentioned.

Acceptance refers to the action of allowing thoughts and emotions to run freely in our mind without being judgemental (Erisman & Roemer, 2010). It has been found that in situations of high stress acceptance has the capacity to reduce emotional experiences (Eifert & Heffner, 2003). Acceptance, much like problem solving, has also been incorporated into psychotherapeutic treatments; specifically into Acceptance and Commitment Therapy which is one of the “third wave of behavioural therapies” (Hayes, Folette, & Linehan, 2004). Low levels of acceptance have been theorized to contribute in the development of mental disorders including generalized anxiety disorder, panic disorder, and substance abuse (McLaughlin, Mennin, & Farach, 2007; Roemer et al., 2008; Tull & Roemer, 2007; Tull, Schulzinger, Schmidt, Zvolensky, & Lejeuz, 2007).

Avoidance or experiential avoidance is defined as the propensity to avoid unwanted internal experiences which can be of a cognitive, emotional, or physical nature (Fernandez de la Cruz et al., 2013). Avoidance is considered a maladaptive strategy and has long been identified as a risk factor in the development of anxiety-based mental disorders including obsessive-compulsive disorder, panic disorder, posttraumatic stress disorder, and specific phobias (Abramowitz, Lackey, & Wheaton, 2009, Begotka et al., 2004, Chawla & Ostafin, 2007, Flessner and Woods, 2006, Kashdan and Kane, 2011; Newman & Llera, 2011).

Rumination refers to the compulsive focus of attention on distressful situations and its consequences rather than concentrating on finding a practical solution to the situation (Aldao, Nolen-Hoeksema, & Schweizer, 2010). Rumination is often associated with various anxiety based disorders and clinical depression as it tends to maintain and exacerbate negative and unproductive thinking which, in turn,

perpetuate the symptoms of those disorders delaying recovery as a result. However, it is important to note that while individuals who ruminate engage in constant and repetitive thinking about a specific problem or situation, they lack “specific content of thought” (Nolen-Hoeksema, Blai, & Wisco, 2008). Rumination is the opposite of problem solving (Hong, 2007). In addition to anxiety disorders and depression, rumination has also been suspected to play a similar role in substance abuse and eating disorders (Aldao, Nolen-Hoeksema, & Schweizer, 2010).

In Gross’ view, the strategies individuals use to regulate emotions are either antecedent focused or response focused (see Figure 1 [Gross, 2003]). An antecedent focused response occurs when an individual enters a specific situation which he/she perceives to be emotional even before feeling any emotion, during which he or she is likely to engage in the use of emotional regulation. An example of such situation would be a job interview, a work or school presentation, etc. A response focused strategy occurs when an individual, who is already feeling an emotion, engages in a situation during which he or she will be required to use emotion regulation (Sloan & Kring, 2007). Rather than focusing on a large number of strategies that fall within the two specific categories above mentioned, Gross and John (2003) concentrated in operationalizing strategies they observed people often use to regulate negative emotions and that could be easily researched in laboratory studies; namely, cognitive reappraisal and expressive suppression. Cognitive reappraisal, an antecedent focused strategy associated with positive outcomes and better psychological functioning, refers to the cognitive changes involved in the assessment and re-evaluation of a potential emotional situation that consequently leads to changes that directly impact the emotional effect of that situation. Expressive suppression, a response focused strategy associated with negative outcomes, refers to the inhibition of emotions and accompanying behaviour during a perceived, emotionally charged situation. Based on this conceptualization, Gross and John developed a self-report measure of individual differences in the use of cognitive reappraisal and expressive suppression; the Emotion Regulation Questionnaire (ERQ). It is important to note that the ERQ has not been used with clinical populations; however, there is strong empirical support for both emotion regulation constructs (Sloan & Kring, 2007).

As before mentioned, difficulties with emotion regulation may be the precursor of a number of problems that may bring as a consequence deficits in areas that have an impact in human development. Specifically, as an individual starts to struggle with issues caused by difficulties in regulating emotion such as a low tolerance to distress, the inability to trust own emotional responses, and a tendency to invalidate own internal, personal, and social experiences, it is very likely that problems in the areas of social cognition and interpersonal functioning will be observed. Since most studies have concentrated on studying the role of emotion regulation as a direct link to interpersonal problems (including relationships), the role of emotion regulation as a mediator has greatly been overlooked and still needs to be further investigated.

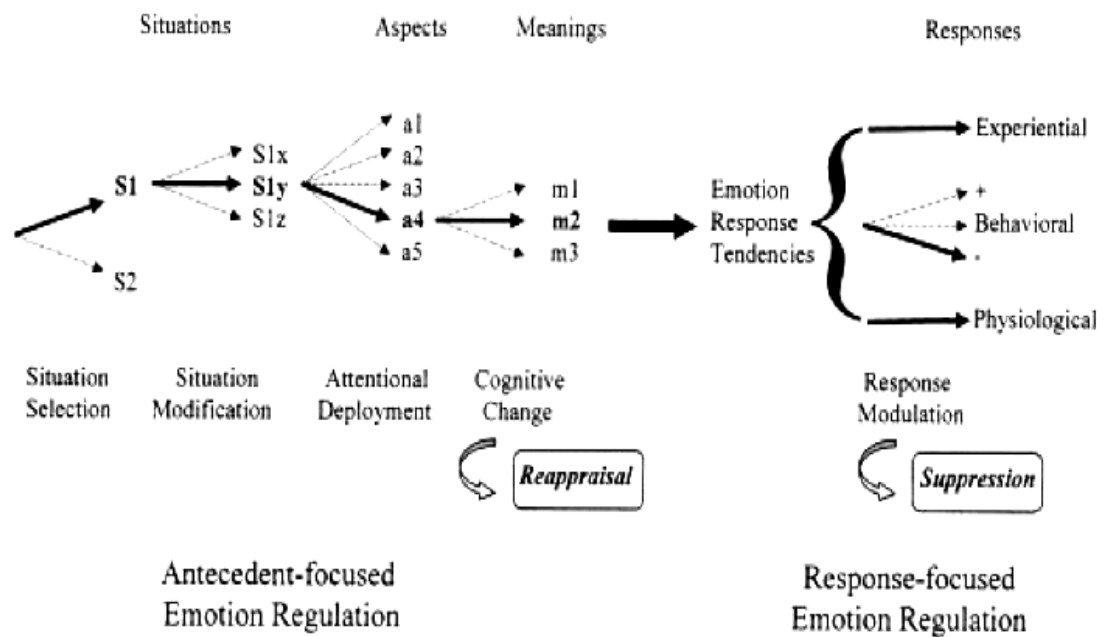


Figure 1. Emotion Regulation Process Model (adapted from Gross, 2001).

## **1.6 Interpersonal Functioning**

Interpersonal functioning can be broadly defined as the capacity of an individual to relate to others (Horowitz, Rosenberg, & Bartholomew, 1993). Interpersonal functioning is intricately interrelated with psychological well-being, and perhaps due to this relationship, interpersonal functioning problems are often observed in clinical populations (McEvoy, Burgess, Page, Nathan, & Fursland, 2012). Even though problems with interpersonal functioning is a characteristic found in several mental disorders including autism spectrum disorders, social phobia, many of the issues in this area are uniquely related to BPD (King-Casas & Chiu, 2012). As noted by Lazarus, Cheavens, Festa, and Rosenthal (2014), interpersonal functioning difficulties are some of the most important traits typically observed in individuals with BPD. It is now believed that interpersonal functioning difficulties are an essential part of the psychological distress and impairments associated with BDP (Gunderson, 2007). Interpersonal functioning problems typically manifest in relationship to others, and they can have a wide range of causes which may include difficulty showing affection, sacrificing own needs in an attempt to please others, being possessive and/or controlling, difficulty socialising, etc.

Interpersonal functioning problems can be explained through different theories (attachment theory, object relationships, and Linehan's biosocial model) all of which contemplate the interaction of early developmental difficulties and other environmental factors with biological factors as the main aetiological contributors to interpersonal problems (Lazarus, Cheavens, Festa, & Rosenthal, 2014). The concept of interpersonal functioning is strongly related to the concept of internal working models as hypothesized by Bowlby. According to Bowlby (1973) early childhood experiences with caregivers lead to the construction of "internal working models" that serve as guiding prototypes for future thoughts, behaviours and feelings. One of the main functions of internal working models is to store important information regarding relationships which will eventually guide the developing child's future thoughts, emotions, and behaviour in relation to self and others. Distressing or traumatic childhood experiences with a caregiver (parental inconsistency, neglect, maltreatment, etc.) may bring as a consequence inconsistent and negative internal

working models. Furthering Bowlby's work, Ainsworth, Blehar, Everett and Wall (1978) hypothesized that positive experiences with caregivers generally bring as a result a secure pattern of attachment, while negative experiences (parental inconsistency, neglect, maltreatment, etc.) may lead to patterns of insecure attachment. The interpersonal functioning problems generally observed in BPD are often associated with negative childhood experiences, patterns of insecure attachment, and distorted views of self and others (Agrawal, Gunderson, Holmes, & Lyons-Ruth, 2004).

## **1.7 Social Cognition**

The concept of social cognition is understood as the conceptualisation of a set of cognitive processes that allow individuals to understand, perceive, interpret, and generate appropriate ways to answer to other people's thoughts, intentions, disposition, and behaviour (Green et al., 2008). Social cognition is a reciprocal process in which an individual is both a receiver and a recipient of social signals which are necessary in everyday human interaction. Hence, the ability of reading and processing social signals appropriately is an essential part of social cognition (Roepke, Vater, Preißler, Heekeren, & Dziobek, 2013). Deficits in social cognition have been found to have an impact on quality of life and overall global functioning (Fett et al., 2011), and they have also been found to be predictors of current and future social functioning (Abdi & Sharma, 2004; Sparks, McDonald, Lino, O'Donnelle, & Green, 2010).

Although the set of cognitive processes (above mentioned) that comprise the concept of social cognition was difficult to narrow down due to the many different proposed variations in the sets of cognitive processes found in the literature, emotion regulation and theory of mind were the two processes most often cited by researchers. This was observed during the review of the literature for the present study and this observation may only be applied to the data bases used by the author. One of the most comprehensive studies relating to this issue was that of Pinkham and colleagues (2013) who developed a general consensus on the critical domains of social cognition. The results found that the processes that best conceptualise social

cognition are mentalizing or theory of mind, emotion regulation, social perception/knowledge, and attributional style (see Table 5 for a description of the four domains of social cognition).

**Table 5.** *Domains of Social Cognition as postulated by Pinkham et al. (2013)*

<b>Emotion Processing</b>	This domain is broadly defined as perceiving and using emotions. It subsumes 3 sub-domains that represent both lower level and higher level processes. At a lower perceptual level is the first sub-domain emotion perception/recognition (identifying and recognizing emotional displays from facial expressions and/or non-face cues such as voice), and at a higher level are the 2 sub-domains of understanding emotions and managing emotions.
<b>Social Perception</b>	Social perception refers to decoding and interpreting social cues in others. It includes social context processing and social knowledge, which can be defined as knowing social rules, roles, and goals (RRGs), utilizing those RRGs, and understanding how such RRGs may influence others' behaviours.
<b>Theory of Mind/Mental State Attribution</b>	This domain is defined as the ability to represent the mental states of others including the inference of intentions, dispositions, and/or beliefs. Theory of mind is also referred to as mentalizing, mental state attribution, or cognitive empathy.
<b>Attributional Style/Bias</b>	Attributional style describes the way in which individuals explain the causes, or make sense, of social events or interactions.



Deficits in social cognition are often observed in specific clinical populations with mental disorders such schizophrenia, autism, some anxiety disorders, and BPD among others (Plana, Lavoie, Battaglia, & Achim, 2013). One of the key aspects of BPD is disturbed relatedness which is comprised of identity disturbance and chronic feelings of emptiness. Social cognition has been hypothesized as one of the most important catalysts of disturbed relatedness (Preißler, Dziobek, Ritter, Heekeren, & Roepke, 2010). As in the case of interpersonal functioning, deficits in social cognition, as observed in BPD, appear to be correlated with a history of childhood maltreatment (Roepke, Vater, Preißler, Heekeren, & Dziobek, 2013).

## **1.8 Aims**

The purpose of the present study is to examine the potential interactions and mediating effects of metacognition and two different types of emotion regulation (emotion regulation suppression and the lack of emotion regulation reappraisal) on the relationship between different three types of childhood maltreatment (sexual, emotional, and physical abuse) and a composite of core BPD features (or traits). The BPD composite consists of two (out of four) major areas of personality functioning and five (out of seven) pathological personality traits (per DSM-5 section III) and was constructed specifically for this study. After that, the same process will be used to examine the potential interactions and mediating effects of metacognition and the two types of emotion regulation above mentioned on the relationship between adult insecure attachment, two types of maternal parental bonding, and the composite of BPD features.

The first inference of this study is that there will be a direct relationship between each of the three types of childhood maltreatment and the composite of BPD traits constructed for this study as suggested on the BPD literature. There will also be an indirect relationship between all three forms of childhood maltreatment and the composite of BPD features which will be mediated by metacognition, emotion regulation suppression, and the lack of emotion regulation reappraisal. It is expected that all three mediators will have a unique effect independent of one another in the above stated relationship. Second, also as suggested in the literature, a direct

relationship between a general form of adult insecure attachment and the composite of BPD features is expected to be found. In addition, an indirect relationship mediated by metacognition, emotion regulation suppression, and the lack of emotion regulation reappraisal is also expected. As in the relationship between childhood abuse and the composite of BPD features, it is expected that all three mediators will have a unique effect in this relationship independent of one another. And third, even though no supporting evidence was found in the literature for the association between maternal parental bonding and BPD features, this relationship will be investigated as maternal bonding is an integral part of attachment.

This study will attempt to answer the following general questions:

- Does emotion regulation (emotion suppression and/or the lack of emotion regulation reappraisal) mediate the relationship between childhood maltreatment (sexual and/or emotional and/or sexual abuse) and the composite of BPD features constructed for this study?
- Does metacognition mediate the relationship between childhood maltreatment (sexual and/or emotional and/or sexual abuse) and the composite of BPD features?
- Does emotion regulation (emotion suppression and/or the lack of emotion regulation reappraisal) mediate the relationship between attachment and the composite of BPD features?
- Does metacognition mediate the relationship between attachment and the composite of BPD features?
- Does emotion regulation (emotion suppression and/or the lack of emotion regulation reappraisal) mediate the relationship between maternal parental bonding and the composite of BPD features?
- Does metacognition mediate the relationship between maternal parental bonding and the composite of BPD features?

Please refer to sub-section 3.14 for the specific hypotheses and a more detailed analysis plan.

## 2 SYSTEMATIC REVIEW

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### 2.1 Objectives

The purpose of this systematic review was to examine the literature on mediation and moderation processes in the relationship between childhood trauma and features associated with BPD, and also in the relationship between attachment and features associated with BPD. In addition, the role of emotion regulation and the role of metacognition as mediators and moderators of relationships involving mental disorders were also investigated. It is important to note that for the purpose of this review the constructs of metacognition, mentalization, and theory of mind were understood to convey the same meaning and terms were used interchangeably throughout. The same logic was applied to emotion, affect regulation and emotion dysregulation.

The following questions were addressed:

1. Is there any evidence of mediation or moderation processes in the relationship between childhood maltreatment and features associated with borderline personality?
2. Is there any evidence of mediation or moderation processes in the relationship between attachment and features associated with borderline personality?
3. Do emotion regulation and/or metacognition play a role in mediating or moderating relationships in psychopathology?

### 2.2 Methods

In order to fully address these questions, three systematic searches were conducted. The searches were independent from one another for all intents and purposes and they were addressed in separate sections of this review in the form of questions 1, 2, and 3.

### **2.2.1 Search Strategy**

Electronic data searches that included PsycInfo (via OVID), PubMed, and Science Direct databases were conducted. In addition, the Cochrane Collaboration Library was also interrogated in order to identify additional systematic reviews and/or meta-analysis not found in the databases above listed. Search terms and syntax were modified as necessary for each database in order to maximize results (See Appendix 1). The EPPI Reviewer 4 software was used for the retrieval process. The EPPI provided the necessary tools to organise a vast amount of peer-reviewed papers and it was most useful in the removal of duplicates.

### **2.2.2 Systematic Selection**

A method of systematic selection was used. Robey and Dalebout (1998) suggested that the evaluation of prospective studies for systematic reviews should be evaluated on the relevance to the review's purpose. They also stated that such studies should have sufficient research acceptability and take into consideration the general purpose and uniqueness of the review at the same time. For this reason, the recommendations outlined in the "framework for best evidence approaches in systematic reviews" published by the US Agency for Healthcare Research and Quality (AHRQ-2011) were followed as these recommendation appear to be in agreement with Robey and Dalebout's suggestions. According to the AHRQ, researchers should strive to include two basic types of inclusion criteria in systematic reviews: (I) criteria pertaining to publication characteristics, and (II) criteria pertaining student design. The second basic type of inclusion criteria is subdivided into (A) study conduct and reporting (e.g. randomization, use of validated measures, etc.) and (B) study relevance to the key questions.

The research articles included in this review met the proposed AHRQ inclusion criteria as follow:

1. The article was written or translated into the English language (I).
2. The publishing journal was from an English speaking country (I).
3. The study was not from neurobiology, neuropsychology, or similar areas of research (II-B).
4. The study was published in or after 1994 which is in agreement with the year the DSM-IV was published (I).
5. The study included the assessment of a mediator(s) and/or a moderator(s) (II-B).
6. The assessed mediator(s) and/or moderator(s) were not a construct rooted on BPD or a form of childhood maltreatment.
7. The study assessed childhood maltreatment (any form of abuse) and Borderline Personality Disorder (or traits/features of the disorder) using validated measures and/or clinical interviews (this criterion was applied to the first systematic search only; i.e. Question 1 [II-A and II-B]).
8. The study assessed attachment (any form of attachment) and Borderline Personality Disorder (or traits/features of the disorder) using validated measures and/or clinical interviews (this criterion was applied to the second systematic search only; i.e. Question 2 [II-A and II-B]).
9. The study assessed relationships involving mental disorders (or traits) in which metacognition and/or emotion regulation were used as either mediators or moderators (this criterion was applied to the third systematic search only; i.e. Question 3 [II-B]).
10. Relationships of mediation or moderation were analysed with bona fide tests only (i.e. Hierarchical Linear Modelling [HLM], Multi-Level Modelling [MLM], Structural Equation Modelling [SEM], etc). Studies in which “only” non-bona fide tests were used (e.g. General Linear Models [GLM]) were not taking into consideration. Also, strictly speaking, the concepts of mediation and moderation were defined only through the statistical method employed; that is, discussion of mediation or moderation in any part of a peer-reviewed article was not enough reason for the article to be included [II-A]).

In addition to following the AHRQ framework in the method of systematic selection of prospective studies, once a research paper was chosen, original sources listed in the references were pursued until exhaustion was reached. It is important to note that the reason for selecting studies that used bona fide tests to evaluate mediation and/or moderation effects only was because, as noted by Raudenbush and Bryk (2002), linear mixed models (including HLM) and multilevel hierarchical models (including nested models) “can lead to substantially different conclusions compared to conventional regression analysis”. According to Raudenbush and Bryk, the reason for such differences resides in the fact that conventional tests (i.e. models in the GLM family) often have issues with biased parameter estimates and inflation of standard errors which may ultimately lead to errors of interpretation.

### **2.2.3 Methodological Quality Assessment and Data Extraction**

The Scottish Intercollegiate Guidelines (SIGN, 2011) for the critical appraisal of studies does not suggest a specific methodology to be used in the assessment of cross-sectional studies. Nonetheless, in order to enhance the quality of this review and to better identify relevant studies, a strict criteria based on known quality rating criteria techniques was developed. Specifically, an amended quality rating criteria for cross-sectional studies, largely based on the SIGN’s (2011) Methodology Checklist for Cohort Studies (see Appendix 2) and on the adapted version of the Newcastle-Ottawa Scale adapted for cross-sectional studies (see Appendix 3; Hermont et al., 2014) was used. The modified criteria consisted of the following:

- 1.1 Was the purpose of the study clearly stated?
- 1.3 Was it clear how many of the people asked to take part did so? (Selection bias)
- 1.5 Was the percentage of individuals recruited who did not complete the assessment stated/included? (Attrition bias)
- 1.6 Was the sample used a true representation of the source population? (Attrition bias)
- 1.7 Were the outcomes and the criteria used for measuring them well defined? (Detection bias)
- 1.10 Were the measures used valid and reliable? (Detection bias)
- 1.11 Were interviews used?

The identifying number assigned to each item (1.1, 1.3, etc) corresponded to the number/area covered in the SIGN's Methodology Checklist for Cohort Studies. The methodology strictness was assessed by the author and two external researchers blind to the study (hereinafter called raters). Both external raters were working on post-doctoral projects at the Newcastle University Institute of Genetic Medicine in Newcastle upon Tyne at the time the appraisal of the studies took place. The external raters, as well as the author, read all the selected research articles in full. Each study was evaluated on a point system. Five coding options were available: (5) Very clear/excellent, (4) Clear/very good, (3) Good, (2) Not very clear/poor, and (1) Not at all clear/unacceptable. The first part of the assessment was performed independently by each of the raters and the results were later compared as a group. At that time item discrepancies were discussed for each study until satisfactory agreement for all items was reached. A single score agreed by all three raters was given following the coding criteria outlined above. A total score based on the seven items included in the methodology checklist was averaged and again converted to match the coding criteria in use.

### **2.3 Ethical Considerations**

This systematic review followed the AHRQ (2011) framework and closely adhered to SIGN 50 (2011), section 6 guidelines for systematic reviews and to the Cochrane Handbook for Systematic Reviews and Interventions as outlined by Green et al (2008). Because of the nature of systematic reviews typical ethical concerns involving participants and/or subjects (e.g., sample selection, randomisation, etc) were not applicable. Anonymity and confidentiality for all the participants were still maintained nevertheless. The Cochrane Handbook states that special considerations must be given to "disadvantaged populations"; however, it was not possible for this review to exclude articles that did not meet this criterion given the low number of studies that were expected to meet the inclusion criteria. It is important to note that systematic reviews have several advantages over traditional reviews, although, it is also ethically responsible to point out that systematic reviews have several drawbacks and limitations. Hence, all possible efforts were made to follow a rigorous and unbiased methodology while systematically reviewing research articles.

## **2.4 Results**

### **2.4.1 Question 1**

*Is there any evidence of mediation or moderation effects in the relationship between childhood maltreatment and features associated with BPD?*

#### **2.4.1.1 Description of Studies**

The adopted search strategy resulted in 988 potential relevant citations. In addition, 16 other articles were identified by following referenced citations in articles of interest. A total of 985 articles were left after duplicates were removed. The abstracts for all 985 articles were read. During the first part of the screening, 727 articles were excluded because the main topic of research was either a form of childhood maltreatment or BPD, but not both. In addition, 22 articles were excluded because they were written in Spanish, French, or Portuguese leaving a total of 236 articles.

All 236 remaining articles appeared to be relevant to the present review, and even though it seemed evident that many of them did not meet the pre-established criteria, they might still contribute to this review with general background information and/or indicate further areas of research. Hence, for this second part of the screening, the abstracts for all these articles were read once again. In addition random partial reading of the full articles was performed as needed until enough information was gathered in order to make an informed final decision. The results after the second part of the screening indicated that a further 215 articles did not meet the inclusion criteria for this review; these articles were removed and just 21 articles were left. The criteria for the removal of the 215 articles were as follow: articles that appeared to be relevant for this review but were clearly out of date with current research ( $N=3$ ); relevant articles that fit better in the area of attachment ( $N=4$ ); articles that were best suited for the area of affect regulation ( $N=5$ ); childhood abuse or BPD articles that belonged in the area of anxiety only ( $N=19$ ); childhood abuse or BPD articles that fit in the area of self-harm only ( $N=21$ ); childhood abuse or BPD articles that belonged to the area of impulsiveness only ( $N=13$ ); childhood abuse or BPD articles that were better suited for the area of schema research and trauma ( $N=14$ );



childhood abuse or BPD articles that belonged to the area of posttraumatic stress disorder ( $N=11$ ); articles that included childhood maltreatment but were related to personality disorder other than BPD ( $N=14$ ); articles that included childhood maltreatment but were related to mental disorders other than BPD ( $N=37$ ); studies involving BPD or childhood maltreatment from areas of neuropsychology, neurobiology, or similar branches of science ( $N=34$ ); possible areas for future research but not relevant to the current review ( $N=14$ ); systematic reviews and/or meta-analysis in areas that included BPD and childhood maltreatment ( $N=18$ ) and mediation or moderation studies in the areas of BPD or childhood maltreatment, but not both ( $N=8$ ).

The final 21 eligible articles appeared to meet most, if not all, the pre-established criteria including the assessment of attachment and BPD, the use of validated measures, and the assessment of a mediator and/or moderator. All 21 research articles were read in full by the reviewer. After an in-depth review it was found that 16 of the 21 articles did not meet the pre-established criteria in full for various reasons including: the use of constructs that lacked a coherent differentiation between BPD and other personality disorders, the use of BPD or a form of childhood abuse constructs as mediators or moderators, the lack of mediation or moderation assessment, and the lack of a bona fide assessment of mediation or moderation.

After all the eligible research articles were reviewed, only five articles that fully met the inclusion criteria were left (see Figure 2 for a full search strategy flow diagram). All five studies included in this review were read in full and assessed for methodology strictness by the reviewer and the two external assessors. Inter-rater reliability was assessed using a two-way mixed, consistency, average-measures intra-class correlations (ICC). Specifically, the ICC assessed the raters' reliability in their ratings of the amended quality rating criteria for cross-sectional studies check list across recorded items. A high degree of reliability was found between the measurements of all three reviewers. The single ICC was .94 with a 95% CI (.901, .968), and the average ICC was .98 with 95% CI (.965 - .989). The high ICC suggests that a minimal amount of measurement error was introduced by the raters.

Four of the studies that met the inclusion criteria (Gratz et al., 2008; Gratz et al., 2011; Igarashi et al., 2011; Rosenthal et al., 2005) investigated the relationship between childhood maltreatment and BPD features, while the remaining study (Paivio & McCulloch, 2004) targeted the relationship between childhood maltreatment and self-injurious behaviour which is a specific feature often associated with BPD. Three of the studies (Gratz et al. [2008], Paivio & McCulloch, and Rosenthal et al.) tested for mediating effects of particular mechanisms in the relationship above stated. The remaining two studies (Gratz et al. [2011] and Igarashi et al.) tested for moderating effects. A summary of key characteristics of the included studies in terms of design, sample size, setting, objectives, and outcome measures is shown in Table 6. In addition, the methodological quality assessment of the five studies included is presented in Table 7.

#### ***2.4.1.2 Characteristics of Communities***

Three studies took place in communities in the United States, one study took place in Japan and one study took place in Canada. Three studies (Gratz et al. [2008], Gratz et al. [2011], and Rosenthal et al.) took place in metropolitan areas and two remaining studies took place at universities. The population size varied from tens to hundreds of people. Most interventions (80%) used samples from one community or one university only, except one study (Igarashi et al., 2010) which used samples of students from two different universities within the same metropolitan area.

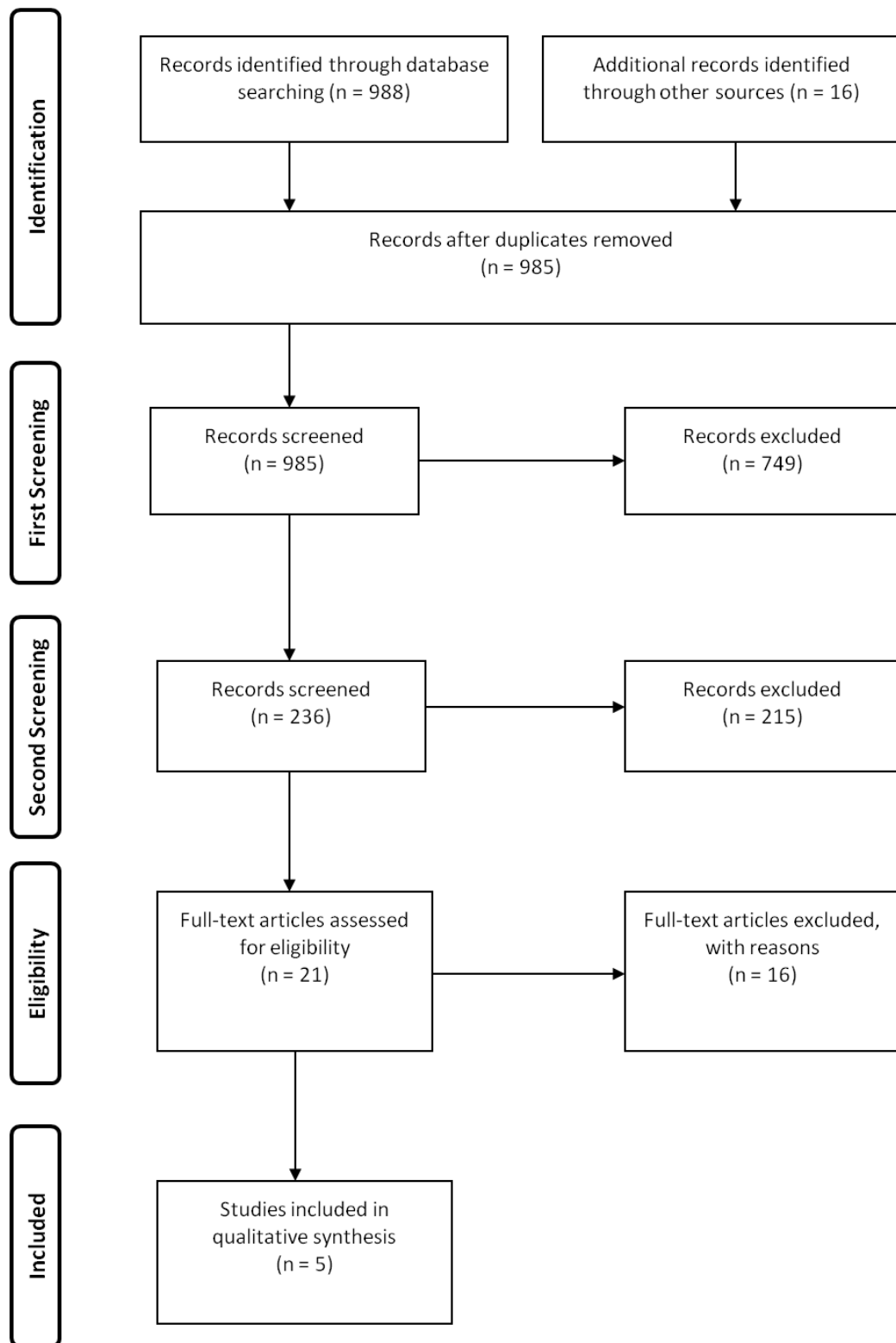


Figure 2. Question 1 - Search strategy flow diagram.

**Table 6.** *Summary of study characteristics*

Authors and country	Study design and sample size	Setting	Study objective/Aims	Outcome measures
Gratz et al., 2008 USA	<ul style="list-style-type: none"> <li>• Cross-sectional study</li> <li>• N = 76 (18-62 Adults )</li> </ul>	Inpatient clinic for substance abuse	To investigate the interrelationship among childhood maltreatment, negative affect, emotion dysregulation, and characteristics associated with BPD.	Childhood abuse, BPD symptoms, and emotion regulation.
Rosenthal et al., 2005 USA	<ul style="list-style-type: none"> <li>• Cross-sectional study</li> <li>• N = 127 (18-55 Adults)</li> <li>• 96 Females, 31 Males</li> </ul>	Community and university setting	To investigate the interrelationship among childhood sexual abuse, negative affect intensity/reactivity, and symptoms of BPD.	Childhood maltreatment, level of affect intensity, and thought suppression.
Gratz et al., 2011 USA	<ul style="list-style-type: none"> <li>• Cross-sectional study</li> <li>• N = 225 (Children 11-14) and their parents</li> <li>• 125 Males, 101 Females</li> </ul>	Community (school district)	To investigate the correlations among childhood borderline personality characteristics, emotional abuse, and two borderline personality traits (affective dysfunction and impulsivity).	Childhood abuse, BPD symptoms, and emotion regulation.
Igarashi et al., 2010 Japan	<ul style="list-style-type: none"> <li>• Cross-sectional study</li> <li>• N = 243 (18-34 Adults)</li> <li>• 198 Females, 45 Males</li> </ul>	University setting	To examine the role of BPD traits in the relationship between childhood maltreatment and the experience of negative life events and/or depression. Also, to consider if a history of childhood abuse and borderline traits increases the likelihood of experiencing greater negative life events.	Childhood maltreatment, BPD, personality organization, negative life events, and level of depression.
Paivio & McCulloch, 2004 Canada	Cross-sectional study N = 100 Females (Mean 21 yrs-Adults )	University setting	To investigate the interrelationship between childhood maltreatment, impaired capacity for emotion regulation and self-injurious behaviours.	Childhood abuse, emotion regulation (alexithymia), and self-harm behaviour.

**Table 7. Methodological Assessment**

SIGN Methodology Checklist 3: Adapted for Cross-sectional Studies	Gratz et al., 2008	Rosenthal et al., 2005	Gratz et al., 2011	Igarashi et al., 2010	Paivio & McCulloch, 2004
1.1 Was the purpose of the study clearly stated?	5	5	5	5	5
1.3 Was it clear how many of the people asked to take part did so? (Selection bias)	3	1	1	1	1
1.5 Was the percentage of individuals recruited who did not complete the assessment stated/included? (Attrition bias)	5	1	1	1	1
1.6 Was the sample used a true representation of the source population? (Attrition bias)	2	3	1	1	1
1.7 Were the outcomes, and the criteria used for measuring those outcomes, well defined? (Detection bias)	5	5	5	3	4
1.10 Were the measures used valid and reliable? (Detection bias)	5	5	3	3	4
1.11 Were interviews used?	5	5	1	1	1
<b>Total Points</b>	30	25	17	15	17
<b>Grade</b>	5	4	3	3	3

#### ***2.4.1.3 Characteristics of Participants***

All studies but one study (Gratz et al., 2011) involved adults 18 years or older. The study by Gratz and colleagues (2011) used children between 11 and 14 years of age. One study (Gratz et al., 2008) used participants who were substance abusers in recovery. One study (Rosenthal et al.) was restricted to participants who had a previous diagnose of BPD and/or had recently self-harmed. Two studies (Igarashi et al. and Paivio & McCulloch) utilised university students. However, Paivio and McCulloch's study used females only. The race/ethnicity of the participants varied considerably but they were generally the population norm in the communities and populations where the studies were carried out. Caucasian non-Hispanic, Hispanics, African-Americans, Asians (Japanese mainly), Native Americans, and others minorities were represented. All but one study (Paivio & McCulloch) were open to male and female participants. In three of the studies the participants received remuneration. In Gratz and colleagues (2008) study with substance abusers in recovery, the participants received between 12 and 20 USD. In Rosenthal's study the participants received 10 USD for their participation, and in Paivio and Maculloch's study the participants received one point course credit.

#### ***2.4.1.4 Interventions***

All studies used self-report measures for the assessment of participants (see Table 8). The study conducted by Gratz and colleagues (2011) included self-report measures for the participant's parents. Furthermore, two studies (Gratz et al. [2008] and Rosenthal et al.) conducted clinical interviews as part of the assessment process. Gratz and colleagues (2008) conducted the interview before administering a battery of self-assessment measures, while Rosenthal and colleagues conducted the interview soon after individual participants concluded the battery of self-assessment measures. Rosenthal and colleagues also conducted a pre-screening clinical interview with prospective participants. In all studies the observations were made at one time point. In the case of the studies that included a clinical interview (40%), the interview session took place soon after the participant concluded the battery of self-report measures. Igarashi et al. study was slightly different as it was carried out for a

period lasting just over nine weeks, although it was not a longitudinal study. It is also relevant to note that this study had the largest sample of participants ( $N=853$ ).

#### **2.4.1.5 Measures**

Most of the studies (80%) used the Childhood Trauma Questionnaire (CTQ) to assess for childhood maltreatment (see Table 8 for a complete list of measures). Igarashi et al. study used the Childhood Abuse Trauma Scale instead. Rosenthal's study was the only study that used the long form of the CTQ. In order to assess for BPD symptoms, two studies (Gratz et al. [2008] and Rosenthal et al.) used the Structured Clinical Interview for DSM-IV Personality Disorders (SCID-II). The Coolidge Personality and Neuropsychological Inventory for Children (CPNI) was used by Gratz et al. (2011), the Inventory of Personality Organization (IPO) was used by Igarashi et al., and the Self-Injurious Behaviors Questionnaire (SIBQ) was used by Paivio and McCulloch. Several other measures were used in order to assess for the specific mediators and moderators researched in each study: The Affect Intensity Measure (AIM), and the Difficulties in Emotion Regulation Scale (DERS) in Gratz et al. (2008) study; The Negative Intensity Scale (AIM-NI) and the Negative Reactive Scale (AIM-NR) of the Affect Intensity Measure (AIM) and the White Bear Suppression Inventory (WBSI) in Rosenthal et al. study; the Revised Child Anxiety and depression Scale (RCADS), and a short form of the Center for Disease Control and Prevention Youth Risk Behavior surveillance System in Gratz et al. (2011) study; and the Toronto Alexithymia Scale (TAS-20) was used by Paivio and McCulloch.

#### **2.4.1.6 Statistical Analyses**

Sixty percent of the studies used the Baron and Kenny's method (1986) for assessing mediational models in combination with either HLM or MLM analyses. The Baron and Kenny method consists of three steps. First, the dependent variable must be regressed on the independent variable in order to assess if the independent variable significantly predicts the dependent variable. Second, the mediator must be regressed on the independent variable in order to assess if the independent variable

significantly predicts the mediator. And third, the dependent variable must be regressed on both, the mediator and the independent variable in order to assess if the mediator is able to significantly predict the dependent variable while controlling for the independent variable. There is a further step suggested by Baron and Kenny (1998) used by Gratz and colleagues (2008) which states that in order to establish that the mediator truly mediates the relationship between the independent and the dependent variables, the effect of the independent variable on the dependent variable while controlling for the mediator should be zero. Both steps 3 and 4 are estimated in the same regression equation (please refer to section 3.8.2 for a critical review of Baron and Kenny's method). Structural Equation Modelling analysis was used by Igarashi and colleagues to assess for moderation effects in their study, while Gratz et al. (2011) used HLM analysis only.

#### ***2.4.1.7 Quality of the Evidence***

In terms of quality, all studies were rated at least or above the "good" level based on the adopted methodology criteria used. All the studies had the purpose of the research clearly stated; hence all of them were given high scores in this area by all three raters. Also, the outcomes and the criteria used to measure those outcomes were well defined, and the measures used were valid and reliable which minimized the risk of detection bias. Related to this was the fact that all but one study (Igarashi et al.) used the same outcome measure to assess childhood maltreatment which was also important.

There was however an important risk of bias that affected the quality of the evidence in most studies as significant issues with selection and attrition bias were found in all but one study (Gratz et al., 2008). Specifically, none of the research articles were clear regarding the number of participants that were asked to take part in the corresponding study. In addition, these same studies also failed to state the number or percentage of participants who did not conclude the assessment. Furthermore only one study (Rosenthal et al.) used a sample representative of the source population which was an indicator of possible attrition bias problems. Another area that precluded 60% of the studies from having better quality criteria scores was the non-



existent use of interviews in the assessment process; Gratz et al.(2008) and Rosenthal et al. were the exception. It is important to point out that most of these problems could be corrected in future studies as they all relate to population sampling, management of participants, and appropriate reporting.

The most significant issues that affected all studies and precluded them from obtaining better quality ratings were the self-imposed limitations caused by the lack of randomization and the homogeneity of the participants. If the researchers in each of the studies had used a random allocation of participants, or at least open their studies to include a more diverse sample of participants, this could have significantly improved their quality scores. Future research would benefit if the methodological limitations above stated were addressed.

#### ***2.4.1.8 Findings***

All five studies found the relationship between childhood maltreatment and BPD features statistically significant. Three of the studies found evidence of either mediation (Gratz et al. [2008] and Paivio & McCulloch) or moderation (Gratz et al., 2011) effects in such relationship. In the study conducted by Rosenthal and colleagues, a mediation effect was found for a different relationship. In the study conducted by Igarashi et al. no evidence of mediation or moderation effects was found. Specifically, Gratz and colleagues (2008) found that the relationship between emotional abuse and BPD diagnostic status was mediated by emotion dysregulation, while Paivio and McCulloch found that alexithymia moderated the relationship between childhood maltreatment and self-injurious behaviour. Similarly, Gratz and colleagues (2008) found that affective dysfunction moderated the relationship between emotional abuse and childhood BPD features. In the study conducted by Rosenthal the researchers found negative affectivity to be a better predictor of BPD symptoms than childhood maltreatment and found support for the mediational effects of thought suppression on that specific relationship.

**Table 8. Question 1: Studies and corresponding measures**

Study	Measures Used			
	Childhood Maltreatment	BDP Symptomology	Emotion Regulation	Other Including Assessment of Attachment, Risk Behaviours, Depression, Anxiety, etc.
Gratz et al., 2008	CTQ	SCID-II	AIM, DERS	SCID-I/P
Rosenthal et al., 2005	CTQ-LF	SCID-II	AIM-NI, AIM-NR, AIM	WBSI
Gratz et al., 2011	CTQ	CPNI	DBD-ODD, DBD-CD	EIS, RCADS,
Igarashi et al., 2010	CATS	IPO	N/A	SDS-Z
Paivio & McCulloch, 2004	CTQ	SIBQ	N/A	TAS-20

*The Childhood Trauma Questionnaire (CTQ); The Childhood Trauma Questionnaire-Long Form (CTQLF); The Childhood Abuse Trauma Scale (CATS); The Structured Clinical Interview for DSM-IV Personality Disorders (SCID-II); The Coolidge personality and Neuropsychological Inventory for Children (CPNI); The Inventory of Personality Organization (IPO); The Self-Injurious Behaviors Questionnaire (SIBQ); The Affect Intensity Measure (AIM); The Difficulties in Emotion Regulation Scale (DERS); The Negative Intensity Scale (AIM-NI); The Negative Reactive Scale (AIM-NR); The Affect Intensity Measure (AIM); The White Bear Suppression Inventory (WBSI); The Revised Child Anxiety and depression Scale (RCADS); The Toronto Alexithymia Scale (TAS-20); The Clinical Interview for Axis I disorders (SCID-I/P); The Self-rating Depression Scale (SDS-Z); The Eysenck Impulsivity subscale (EIS); Disruptive Behavior Disorders Rating Scale-Oppositional Defiant Sub-Scale (DBD-ODD); The Conduct Disorder Sub-Scale (DBD-CD).*

#### **2.4.1.9 Limitations**

Several limitations affected the studies in this review. First of all, all studies used self-report measures as their principal form of assessment. The problems in using self-report measures have been thoroughly documented, and while sometimes this may be the only available alternative for researchers, it is always recommended to include other methods of assessment whenever possible (Achenbach, Krukowski, Dumenci, & Ivanova, 2005; Spector, 1994). Furthermore, since the main measure used by eighty percent of the studies to assess for childhood maltreatment was the CTQ, it is important to note the high possibility of retrospective bias. Second, all studies included in this review used of cross-sectional designs and correlational data to examine their variables of interest which severely limit their ability to infer causal relationships and variable directionality. Third, since all of the studies used non-randomised samples of convenience instead of clinical populations, their generalizability is limited. And last, sixty percent of the studies used the hierarchical multiple regression strategy of Baron and Kenny which is well known for its statistical shortcomings including low statistical power and invalid causal differences when applied to misspecified models (Rosopa & Stone-Romero, 2008).

#### **2.4.1.10 Conclusions**

Even though there is enough evidence to suggest that childhood abuse, and neglect to an extent, are important indicators of future BPD symptomology, the evidence is still not clear regarding which type of maltreatment plays the most important role. Neglect and emotional abuse were significantly related to the development of BPD features in two studies, while sexual abuse was also found to be significant predictor of BPD traits in another two studies. Physical abuse was not studied as a stand-alone condition in any of the research papers included in this review. Interestingly enough, one study found negative affectivity to be a better predictor of BPD symptoms than childhood sexual abuse; and while affect intensity/reactivity accounted for a unique variance in BPD symptoms, negative affect intensity/reactivity was not found to be a predictor of BPD status. Emotion regulation was also found to be a significant predictor of BPD features. Furthermore, a statistically significant relationship existed between emotion regulation and emotional abuse.

The role of thought suppression as mediator in the relationship between negative affectivity and BPD symptoms was fully supported. Unique associations were also found between childhood borderline personality features and affective dysfunction, and between childhood borderline personality features and impulsivity. No evidence was found to support the interrelation of affective dysfunction and impulsivity in childhood BPD features. One study also found that neglect, emotional abuse and sexual maltreatment influenced the development of “trait” (transitory) depression which could be significant if this is seen from a dimensional DSM-5 approach in which “depressivity” plays an important role in the development and maintenance of BPD.

To summarize, the empirical literature suggests that external mechanisms may play a role as mediators and moderators in the relationship between childhood maltreatment and features associated with borderline personality features; however, the supporting evidence is not strong. Yet, emotion regulation appears to play an important role in the relationship between childhood maltreatment and BPD as it was found to be a mediator, a moderator, and even a predictor of BPD symptomology. Nevertheless, more research is needed before better conclusions regarding the role of external mechanisms in the relationship between childhood maltreatment and BPD features can be reached.

## 2.4.2 Question 2

*Is there any evidence of mediation or moderation effects in the relationship between attachment and features associated with BPD?*

### 2.4.2.1 Description of Studies

The adopted search strategy resulted in 1803 potentially relevant citations. However, a significant number of research articles ( $N=266$ ) were removed soon after the initial search as they were published before 1994; after this 1537 articles were left. Thirteen other articles referenced in various sources were also found to be potentially relevant. Further removal of duplicates left 1504 relevant articles. The abstracts for all 1504 journal articles were read. During the first part of the screening, 831 articles were excluded because the main topic of research was either a form of attachment or BPD, but not both. In addition, 61 other articles were excluded because they were written in French, Spanish, and/or Italian leaving a total of 612 articles to be considered for this review.

All remaining articles appeared to be relevant, and even though it seemed evident that many of them did not meet the pre-established criteria, they might still contribute to this review with general background information and/or indicate further areas of research. During the second part of the screening, the abstracts for all these articles were read once again. In addition random partial reading of the full articles was performed as needed until enough information was gathered in order to make an informed final decision. After the second part of the screening, a further 582 research articles did not meet the inclusion criteria for this review, and therefore were removed. The criteria for the removal of the 582 articles were as follow: systematic reviews and/or meta-analysis in areas that included BPD and attachment as the main topics of research, but not both ( $N=34$ ); studies involving either attachment and/or BPD from the areas of neuropsychology, neurobiology, or similar branches of science ( $N=58$ ); relevant articles that fit better in the area of childhood abuse ( $N=44$ ), relevant articles that involved areas of attachment or BPD but were best suited for the area of anxiety disorders (excluding posttraumatic stress disorder  $N=31$ ), relevant articles that involved areas of attachment or BPD but belonged to the area of posttraumatic stress disorder ( $N=43$ ), attachment related articles that fit

better in the area of schema research ( $N=48$ ), attachment related articles involving personality disorders other than BPD ( $N=166$ ) and attachment or BPD related articles involving other mental disorders not relevant to this review (excluding personality and anxiety disorders;  $N=158$ ).

After the second screening a total of 30 research articles seemed eligible to be included in this review. All 30 research articles were read in full by the reviewer and only one article met the pre-established criteria in full (see Figure 3 for a full search strategy flow diagram). The specific reasons why 29 articles did not meet the pre-established criteria were as follow: the use of constructs that lacked a coherent differentiation between BPD and other personality disorders, the use of BPD or forms of attachment as mediators or moderators, the lack of mediation or moderation assessment, and the lack of a bona fide assessment of mediation or moderation. The only study left was read in full and assessed for methodology strictness by the reviewer and two external raters. Inter-rater reliability was assessed using a two-way mixed, consistency, average-measures intra-class correlations (ICC) to assess the raters' consistency in their ratings of the amended quality rating criteria for cross-sectional studies check list across recorded items. A high degree of reliability was found between the measurements of all three reviewers. The single ICC was .93 with a 95% CI (.771, .987), and the average ICC was .97 with 95% CI (.910 - .995). The high ICC suggests that a minimal amount of measurement error was introduced by the raters.

The single study that met the inclusion criteria (Wei et al., 2005) investigated two emotion regulation related mediators in the relationships between attachment anxiety and interpersonal problems; and in the relationship between attachment avoidance and interpersonal problems. One of the most prevalent features associated with BPD is interpersonal problems. A summary of key characteristics of Wei et al. study in terms of design, sample size, setting, objectives, and outcome measures are shown in Table 9 and the methodological quality assessment is presented in Table 10 below.

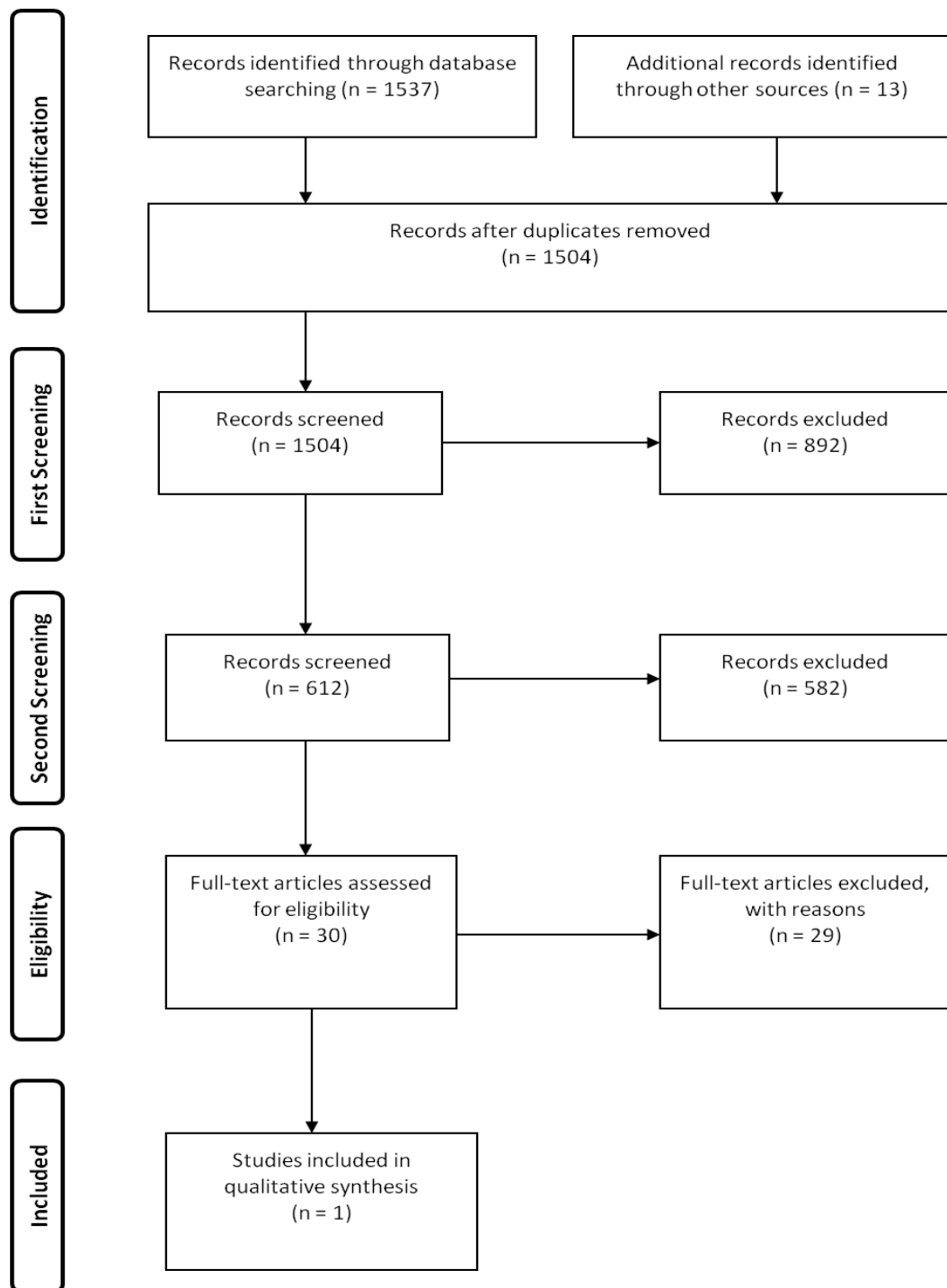


Figure 3. Question 2 - Search strategy flow diagram.

**Table 9.** *Summary of study characteristics*

Authors and country	Study design and sample size	Setting	Study objective/Aims	Outcome measures
Wei et al., 2005 USA	<ul style="list-style-type: none"><li>• Cross-sectional study</li><li>• N = 229 (18-43 Adults)</li><li>• 148 Females, 70 Males, 11 Not specified</li></ul>	University setting	To examine emotional reactivity as a mediator in the relationship between attachment anxiety and interpersonal problems and/or negative mood. Also, to investigate the role of emotional cut-off as a mediator in the relationship between attachment avoidance and interpersonal problems and/or negative mood.	Interpersonal problems, experiences in close relationships, differentiation of self, anxiety, and depression.



**Table 10. Methodological Assessment**

SIGN Methodology Checklist 3: Adapted for Cross-sectional Studies	Wei et al., 2005
1.1 Was the purpose of the study clearly stated?	5
1.3 Was it clear how many of the people asked to take part did so? (Selection bias)	1
1.5 Was the percentage of individuals recruited who did not complete the assessment stated/included? (Attrition bias)	1
1.6 Was the sample used a true representation of the source population? (Attrition bias)	1
1.7 Were the outcomes, and the criteria used for measuring those outcomes, well defined? (Detection bias)	4
1.10 Were the measures used valid and reliable? (Detection bias)	4
1.11 Were interviews used?	1
<b>Total Points</b>	17
<b>Grade</b>	3

**2.4.2.2 Description of the Study**

Wei and colleagues (2005) investigated the effects of two proposed mediators in the relationship between adult attachment and interpersonal problems which is one of the characteristics typically associated with BPD.

**2.4.2.3 Characteristics of Communities and of Participants**

The study was conducted in a community in the USA. A sample of 229 university students aged between 18 and 43 was used. One hundred and forty-eight participants were females (65%), seventy were male (31%), and 11 participants did not specify their gender. The racial/ethnic make-up of the participants was as follows: 85%

identified themselves as Caucasian-non Hispanic, 4% as Black/African American, 1% as Hispanic, 1% as Asian, and the rest of the participants identified themselves as “other” ethnic group. Because of the nature of the study, gathering information on relationship status was important. Forty-six percent of the participants were in a committed relationship, 44% were single, and 3% were married. No inclusion/exclusion criteria were stated by the authors.

#### ***2.4.2.4 Interventions and Measures***

The participants were remunerated with course credit for their participation. The study consisted of a battery of self-assessment measures which was administered in groups of 5 to 30 students. The following psychometric measures were used: The Experiences in Close Relationships Scale (ECRS), the Differentiation of Self Inventory (DSI), the Depression and Anxiety subscales from the Depression Anxiety and Stress Scales (DASS), the Inventory of Interpersonal Problems-Short Circumplex Form (IIP-SC) and the UCLA Loneliness Scale-Version 3. The participants were under the understanding they were participating in a study researching emotions involved in romantic relationships.

#### ***2.4.2.5 Statistical Analyses***

The process recommended by Anderson and Gerbing (1988) followed by Structural Equation Modelling analyses were used to assess the proposed mediational model. The authors searched for an acceptable model that fit the data through confirmatory factor analysis first, and then, once an acceptable model was found, the structural model was tested. The measurement model was estimated using the Maximum Likelihood Method, and the nested model was compared using the corrected scaled Chi-Square Difference Test.

#### ***2.4.2.6 Quality of the Evidence***

The only study that met the set criteria was rated “good” based on the adopted quality assessment. However, since this was only “one” study, it is important to note that no significant assumptions can be made. Nevertheless, it is also important to

point out that this study had some of the same strengths and also some of the same weaknesses as the studies selected in the previous section (Question 1). The strengths included the fact that the purpose of the research was clearly stated, the outcomes and the criteria used to measure those outcomes were well defined, and the measures used were valid and reliable. The weaknesses related to problems with attrition and selection bias since it was not made clear how many participants were asked to participate in the study, the number of participants who left the study before its conclusion was not mentioned, and the sample of participants used was not a true representation of the source population.

#### ***2.4.2.7 Findings***

Evidence of mediation effects of external mechanisms in the relationship between adult attachment and interpersonal problems was found. In addition, the results indicated that emotional reactivity mediated the relationship between attachment anxiety and negative mood. The results also suggested that emotional cut-off partially mediated the relationship between attachment avoidance and negative mood. The authors noted that the variance in negative mood was only partially explained by emotional reactivity and emotional cut-off (36%), while the variance in interpersonal problems was explained (75%) by attachment anxiety, attachment avoidance, emotional reactivity, and emotional cut-off. The results however, indicated that the constructs of attachment anxiety and emotion reactivity did not overlap with one another.

#### ***2.4.2.8 Limitations***

The researchers in this study used a sample of convenience as all the participants were undergraduate students enrolled in psychology classes at the university where the researchers were based. This indicates that a high degree of selection bias may be present. The researchers provided a good and very detailed description of the demographics of the participants which was in line with the population characteristics of the university. However, they did not provide information regarding the selection criteria used in the study, and they did not specify the number

of participants who were approached to take part but choose not to participate which raised the possibility of selection and attrition bias.

#### ***2.4.2.9 Conclusions***

The empirical literature provides very limited evidence in support of the notion that external mechanisms either mediate or moderate the relationship between attachment and borderline personality features. Only one study was found that partially met the criteria for relevance and methodology. Hence, it is not possible to draw specific conclusions about the role of any mediators or moderators relating to the above stated relationships.

### 2.4.3 Question 3

*Do emotion regulation and/or metacognition play a role in mediating or moderating relationships in psychopathology?*

#### 2.4.3.1 Description of Studies

The search strategy resulted in 71 potentially relevant studies for emotion regulation, and 470 potentially relevant studies for metacognition (i.e. metacognition = 129; mentalization = 155; Theory of Mind = 186). Five other articles referenced in various sources were also found to be potentially relevant. A total of 524 research articles were left after duplicates were removed; 71 in the area of emotion regulation and 453 in the area of metacognition. The abstracts for all 524 articles were read. During the first part of the screening, 450 articles were excluded: 21 in the area of emotion regulation and 429 in the area of metacognition.

Regarding emotion regulation, 19 articles were excluded as they were from areas of neuropsychology, neurobiology, or similar branches of science; and 2 studies were removed as they were written in a language other than English. Regarding metacognition, the criteria for the removal of the 429 articles were as follow: research articles that included mentalization, or theory of mind, or metacognition or BPD, but neither of the concepts was associated with one another in any significant way ( $N=279$ ); articles written in a language other than English ( $N=24$ ); systematic reviews or meta-analysis that included BPD and metacognition, mentalization, or theory of mind ( $N=7$ ); research articles from areas of neuropsychology, neurobiology, or similar branches of science ( $N=24$ ); articles psychotherapeutically oriented that appeared to meet some of the necessary criteria but were removed after further consideration ( $N=65$ ); schema related articles that contributed to general background but failed to meet the basic inclusion criteria ( $N=19$ ) and duplicate articles once metacognition, theory of mind, and mentalization were combined ( $N=11$ ). In both cases the remaining research articles appeared to be important and even though it seemed clear that many of them did not meet the pre-established criteria, they might still contribute to this review with general background information and/or indicating further areas of research. In all, 74 research articles were eligible after the first screening process; 50 from the area of emotion regulation,

and 24 from the area of metacognition (see Figure 4 for a full search strategy flow diagram).

During the second part of the screening, the abstracts for all 74 remaining research articles were read once again. In addition random partial reading of the full articles was performed as needed until enough information was gathered in order to make an informed final decision. The second part of the screening indicated that a further 58 articles did not meet the inclusion criteria for this review. These articles were removed, leaving 16 research articles that still met the inclusion criteria for this review; 2 articles from the area of emotion regulation and 14 articles from the area of metacognition (see Figure 4). The removal of these 58 research articles was due to the fact that neither emotion regulation nor metacognition were used as mediators or moderators in any of the studies.

The final 16 eligible articles appeared to meet most, if not all, the pre-established criteria including the use of validated measures, and the assessment of a mediator and/or moderator. All 16 research articles were read in full by the reviewer. After an in-depth review it was found that only 5 research articles met the pre-established criteria in full. The eleven remaining articles were not included because while they assessed relationships involving mental disorders through mediation or moderation, and either emotion regulation or metacognition were used, a bona fide assessment of mediation or moderation was not used. All five articles included were read in full and assessed for methodology strictness by the reviewer and two external raters. In addition, 3 studies (Gratz et al., 2008; Gratz et al., 2011; Rosenthal et al., 2005) previously assessed for methodology strictness by the reviewer and the two external raters in Question 1 were also included as they were relevant to this section as well.

Inter-rater reliability was assessed using a two-way mixed, consistency, average-measures intra-class correlations (ICC) to assess the raters' consistency in their ratings of the amended quality rating criteria for cross-sectional studies check list across recorded items. A high degree of reliability was found between the measurements of all three reviewers. The single ICC was .93 with a 95% CI (.901,

.959), and the average ICC was .98 with 95% CI (.965 - .986). The high ICC suggests that a minimal amount of measurement error was introduced by the raters.

Seven of the studies that met the inclusion criteria (Cheavens et al., 2005; Gratz et al., 2008; Gratz et al., 2011; Hasking et al., 2010; McLaughlin et al., 2009; Rosenthal et al., 2005; Sharp et al., 2011) investigated relationships involving BPD or at least BPD features. The remainder study (Karreman & Vingerhoets, 2012) investigated attachment and well-being. Three studies (Cheavens et al., Hasking et al. and Karreman & Vingerhoets) investigated relationships involving emotion regulation; and in two cases (Cheavens et al. and Kerreman & Vingerhoets), the specific role of suppression was examined. Four other studies investigated either affective intensity or dysregulation. In addition, three studies (Cheavens et al., Gratz et al. [2011], and Rosenthal et al.) investigated the role of childhood abuse in relationship to BPD. A summary of key characteristics of the studies in terms of design, sample size, setting, objectives, and outcome measures are shown in Table 11 and Table 12. In addition, the methodological quality assessment of the eight studies is presented in Table 13 and Table 14.

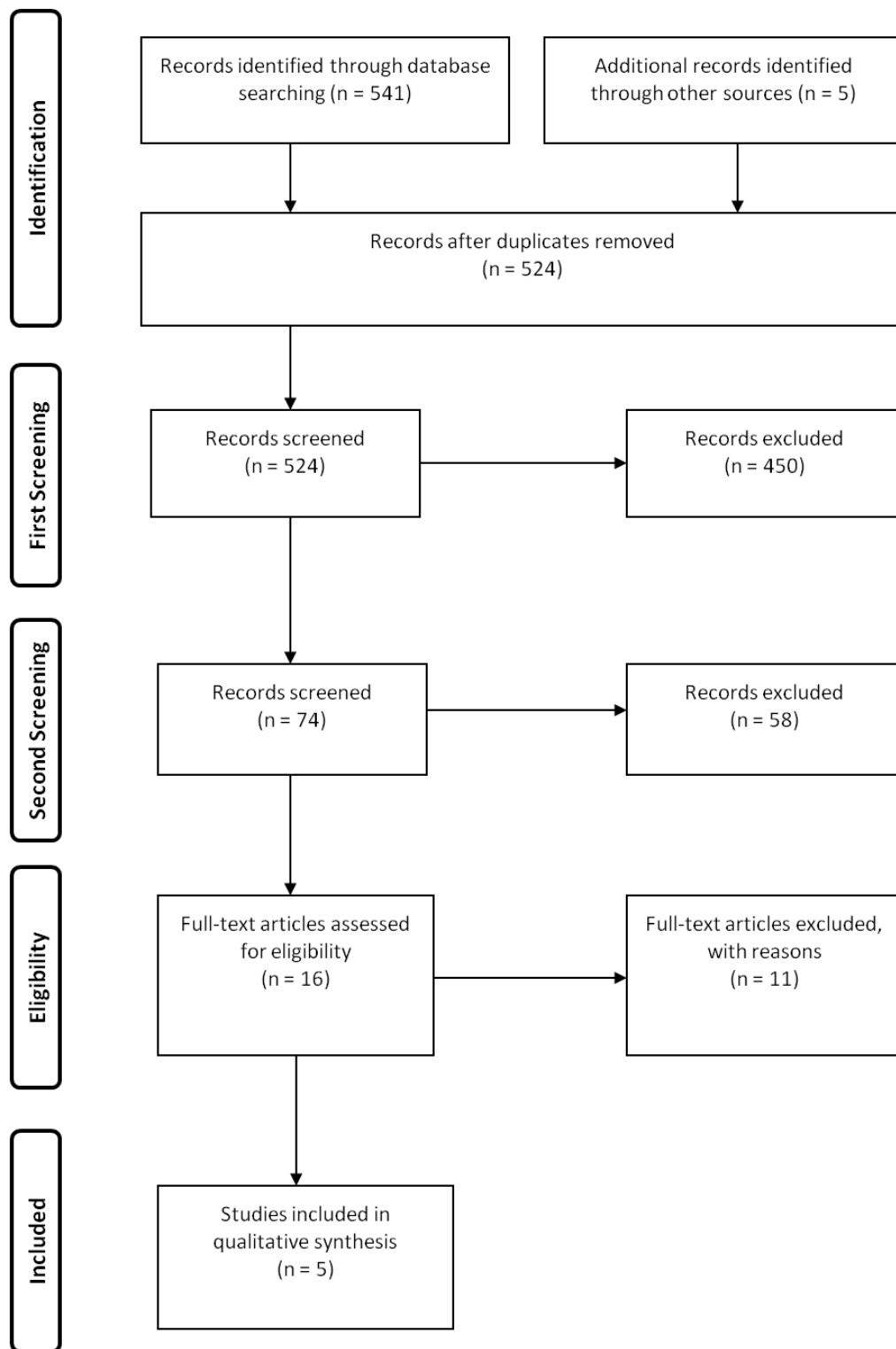


Figure 4. Question 3 - Search strategy flow diagram.



**Table 11.** *Summary of study characteristics*

Authors and country	Study design and sample size	Setting	Study objective/Aims	Outcome measures
Cheavens et al., 2005 USA	<ul style="list-style-type: none"> <li>• Cross-sectional study</li> <li>• N = 202 (Adults)</li> <li>• 123 Females, 77 Males, 2 Not specified</li> </ul>	University setting	To investigate the interrelationship among biological predisposition, social environment, emotion regulation, and characteristics associated with BPD.	Negative intensity, affect intensity, thought suppression, perceived parental criticism, and interpersonal problems.
Karreman & Vingerhoets, 2012 The Netherlands	<ul style="list-style-type: none"> <li>• Cross-sectional study</li> <li>• N = 632 (16-67 Teenagers and Adults)</li> <li>• 327 Females, 305 Males</li> </ul>	Community and university setting (web-based)	To investigate the mediating role of two emotion regulation strategies (reappraisal and suppression) and also the role of resilience in the relationship between attachment and well-being.	Attachment, emotion regulation, and resilience.
McLaughlin et al., 2009 USA	<ul style="list-style-type: none"> <li>• Cross-sectional study</li> <li>• N = 1065 (Children 11-14 6<sup>th</sup> and 7<sup>th</sup> graders)</li> <li>• 520 Females, 545 Males</li> </ul>	School district	To investigate the interrelationship among adolescent mental health problems, stress, and the emotion dysregulation.	Stressful life events, emotion dysregulation, depressive symptoms, sadness, and rumination.
Sharp et al., 2011 USA	<ul style="list-style-type: none"> <li>• Cross-sectional study</li> <li>• N = 111 (12-17 Teenagers)</li> <li>• 62 Females, 49 Males</li> </ul>	Inpatient clinic for adolescents with psychological problems	To investigate the relationship between theory of mind and BPD features.	Mental disorders (mood, anxiety, and disruptive behaviour), social cognition, psychopathic traits, emotion regulation, and BPD features.

**Table 12.** *Summary of study characteristics*

Authors and country	Study design and sample size	Setting	Study objective/Aims	Outcome measures
Hasking et al., 2010 Australia	<ul style="list-style-type: none"> <li>• Cross-sectional study</li> <li>• N = 393 (13-18 Teenagers)</li> <li>• 269 Females, 124 Males</li> </ul>	School district	To investigate the role of emotion regulation and coping in the relationship between non-suicidal self-injury and personality.	Personality, coping, emotion regulation, level of distress, and self-injury.
Gratz et al., 2008 USA	<ul style="list-style-type: none"> <li>• Cross-sectional study</li> <li>• N = 76 (18-62 Adults )</li> </ul>	Inpatient clinic for substance abuse	To investigate the interrelationship among childhood maltreatment, negative affect, emotion dysregulation, and characteristics associated with BPD.	Childhood abuse, BPD symptoms, and emotion regulation.
Rosenthal et al., 2005 USA	<ul style="list-style-type: none"> <li>• Cross-sectional study</li> <li>• N = 127 (18-55 Adults)</li> <li>• 96 Females, 31Males</li> </ul>	Community and university setting	To investigate the interrelationship among childhood sexual abuse, negative affect intensity/reactivity, and symptoms of BPD.	Childhood maltreatment, level of affect intensity, and thought suppression.
Gratz et al., 2011 USA	<ul style="list-style-type: none"> <li>• Cross-sectional study</li> <li>• N = 225 (Children 11-14) and their parents</li> <li>• 125 Males, 101 Females</li> </ul>	Community (school district)	To investigate the correlations among childhood borderline personality characteristics, emotional abuse, and two borderline personality traits (affective dysfunction and impulsivity).	Childhood abuse, BPD symptoms, and emotion regulation.

**Table 13. Methodological Assessment**

SIGN Methodology Checklist 3: Adapted for Cross-sectional Studies	Cheavens et al., 2005	Karreman & Vingerhoets, 2012	McLaughlin et al., 2009	Sharp et al., 2011	Hasking et al., 2010
1.1 Was the purpose of the study clearly stated?	5	5	5	5	2
1.3 Was it clear how many of the people asked to take part did so? (Selection bias)	1	1	5	1	1
1.5 Was the percentage of individuals recruited who did not complete the assessment stated/included? (Attrition bias)	1	1	5	1	1
1.6 Was the sample used a true representation of the source population? (Attrition bias)	1	3	3	1	1
1.7 Were the outcomes, and the criteria used for measuring those outcomes, well defined? (Detection bias)	4	4	4	5	5
1.10 Were the measures used valid and reliable? (Detection bias)	4	4	4	5	5
1.11 Were interviews used?	1	1	1	1	1
<b>Total Points</b>	17	19	27	19	16
<b>Grade</b>	3	3	4	3	3

**Table 14. Methodological Assessment**

SIGN Methodology Checklist 3: Adapted for Cross-sectional Studies	Gratz et al., 2008	Rosenthal et al., 2005	Gratz et al., 2011
1.1 Was the purpose of the study clearly stated?	5	5	5
1.3 Was it clear how many of the people asked to take part did so? (Selection bias)	3	1	1
1.5 Was the percentage of individuals recruited who did not complete the assessment stated/included? (Attrition bias)	5	1	1
1.6 Was the sample used a true representation of the source population? (Attrition bias)	2	3	1
1.7 Were the outcomes, and the criteria used for measuring those outcomes, well defined? (Detection bias)	5	5	5
1.10 Were the measures used valid and reliable? (Detection bias)	5	5	3
1.11 Were interviews used?	5	5	1
<b>Total Points</b>	30	25	17
<b>Grade</b>	5	4	3

#### ***2.4.3.2 Characteristics of Communities***

Six studies (75%) took place in communities in the United States. One study took place in the Netherlands, and one study took place in Australia. Three studies (38%) were based at school districts, two were community based, one study was carried out at a university, and one study at a clinic for the treatment of mental disorders. The population size varied from tens to hundreds of people. One of the studies (Haskin et al., 2010) involved 14 secondary schools, one involved a whole school district (McLaughlin et al., 2009), one study (Sharp et al., 2011) used in-patients at a mental health clinic, and one study (Karreman & Vingerhoets, 2012) was internet based. The rest of the studies involved members of the community or university students.

#### ***2.4.3.3 Characteristics of Participants***

Fifty percent of the studies involved adults 18 years or older, three of them (38%) involved school-aged children, and the study by Sharp and colleagues involved adolescents aged between 12 and 17 years of age. Sharp et al. study only included participants who were in-patients at a mental health clinic. None of the studies was gender specific, and both males and females had equal opportunity to participate. The race/ethnicity of the participants varied considerably but they were the norm for the communities and populations where the studies were carried out. Caucasian non-Hispanic, Hispanics, African-Americans, Asians, Native Americans, and other minorities were represented. In three of the studies (38%), the participants received remuneration. In Gratz et al. (2008) study, the participants received between 12 and 20 USD, in Rosenthal et al. (2005) study the participants received 10 USD and Cheavens et al. (2005) study the participants received course credit.

#### ***2.4.3.4 Interventions***

All studies used self-report measures for the assessment of participants. In most studies (75%), the observations were made at one time point. It is important to note however, that none of the studies in the remainder 25% was longitudinal. Three studies (Gratz, et al., 2008; Rosenthal et al., 2005; Sharp et al., 2011) conducted clinical interviews as part of the process. Gratz and colleagues (2008) conducted the

interview before administering a battery of self-assessment measures. In Sharp's study, the interview was part of the initial assessment for admission to the mental health clinic. In Rosenthal's study the interview took place soon after individual participants concluded a battery of self-assessment measures. Rosenthal and colleagues also conducted a pre-screening clinical interview with prospective participants.

#### ***2.4.3.5 Measures***

A wide variety of measures were used (see Table 15 for a complete list of measures) but only a few measures were shared by more than two studies. The studies conducted by Gratz et al. (2008), Gratz et al. (2011), and Rosenthal et al. used the Childhood Trauma Questionnaire (CTQ) to assess for childhood maltreatment and the Structured Clinical Interview for DSM-IV Personality Disorders (SCID-II) to assess for BPD symptoms. Both studies also used scales of the Affect Intensity Measure (AIM) to assess for affect intensity. Cheavens and colleagues used scales of the AIM for the same purpose. Rosenthal et al. and Cheavens et al. both used the White Bear Suppression Inventory (WBSI) to assess for emotion regulation thought suppression. Other measures used to assess for emotion regulation included: The Difficulties in Emotion Regulation Scale (DERS) used in Gratz et al. (2008) and Sharp et al. studies, the Emotion Regulation Questionnaire (ERQ) used by Kerreman and Vingerhoets, The Emotion Expression Scale for Children (EESC) and the Dysregulation Scale for Children's Sadness Management Scale (CSMS) used by McLaughlin and colleagues, and the Emotion Regulation Scale (ERS) used by Hasking and colleagues.

**Table 15. Question 3: Studies and corresponding measures**

Study	Measures Used			
	Childhood Maltreatment	BDP Symptomology	Emotion Regulation	Other
Gratz et al., 2008	CTQ	SCID-II	AIM, DERS	SCID-I/P
Rosenthal et al., 2005	CTQ-LF	SCID-II	AIM-NI, AIM-NR, AIM	WBSI
Gratz et al., 2011	CTQ	CPNI	DBD-ODD/CD	EIS, RCADS,
Cheavens et al., 2005	N/A	IIP-MOD	AIM-NI, AIM-NR, AIM	WBSI, MPS-PC, I-7-IS
Karreman & Vingerhoets, 2012	N/A	N/A	ERQ	ASQ, WHO-5
McLaughlin et al., 2009	N/A	N/A	CAMS	LES, CDI, EESC, CMS, CRSQ
Sharp et al., 2011	N/A	BPFSC, CI-BPD	DERS	YSR, APSD
Hasking et al., 2010	N/A	IPIP	ERS	BIS, SIQ

*The Childhood Trauma Questionnaire (CTQ); The Childhood Trauma Questionnaire-Long Form (CTQLF); The Structured Clinical Interview for DSM-IV Personality Disorders (SCID-II); The Coolidge personality and Neuropsychological Inventory for Children (CPNI); The Affect Intensity Measure (AIM); The Negative Intensity Scale (AIM-NI); The Negative Reactive Scale (AIM-NR); The Difficulties in Emotion Regulation Scale (DERS); The White Bear Suppression Inventory (WBSI); The Revised Child Anxiety and depression Scale (RCADS); The Center for Disease Control and Prevention Youth Risk Behavior surveillance System-Short Form (CDC-PYRBS-SF); The Clinical Interview for Axis I disorders (SCID-I/P); The Eysenck Impulsivity subscale (EIS); Disruptive Behavior Disorders Rating Scale- Oppositional Defiant Sub-Scale (DBD-ODD) and the Conduct Disorder Sub-Scale (DBD-CD); The Multi-dimensional Perfectionism Scale-Parental Criticism (MPS-PC); The Impulsivity Subscale of the I-7 questionnaire (I-7-IS); The Modified Inventory of Interpersonal Problems (IIP-MOD); the Attachment Styles Questionnaire (ASQ); The Emotion Regulation Questionnaire (ERQ); The Well Being Index (WHO-5); The Life Events Scale for Children (LES); The Children's Depression Inventory (CDI); The Emotion Expression Scale for Children (EESC); The Dysregulation Scale for Children's Sadness Management Scale (CSMS); The Children's Sadness Management Scale (CAMS); The rumination subscale from the Children's Response styles Questionnaire (CRSQ); The Diagnostic Interview Schedule for Children (DISC); The Movie for the Assessment of Social Cognition (MASC); The Borderline Personality Features Scale for Children (BPFSC); The Childhood Interview for DSM-IV Borderline Personality Disorder (CI-BPD); The Youth Self-Report. The Youth Self-Report (YSR); The Antisocial Process Screening Device (APSD); The Difficulties in Emotion Regulation Strategies Scale (DERS); The International Personality Item Pool (IPIP); The Adolescent Coping Scale (ACS); The Emotion Regulation Scale (ERS); The Brief Symptom Inventory (BSI); Self-injury questionnaire. (SIQ).*

#### **2.4.3.6 Statistical Analyses**

Fifty percent one of the studies used the Baron and Kenny's method (1986) in combination with either HLM or MLM analyses as the preferred method for assessing the proposed mediation/moderation effects. One study (Kerreman & Vingerhoets, 2012) used SEM to assess the proposed mediation models. The remaining three studies (Gratz et al., 2011; Haskings et al., 2010; Sharp et al., 2011) all used HLM analyses only (i.e. these studies did not use the Baron and Kenny approach), in addition, Sharp and colleagues also added the use of MLM analyses.

#### **2.4.3.7 Quality of the Evidence**

As in the case of the research articles reviewed in question 1, the quality of all the studies was rated at least or above the "good" level. The main reasons for this were that in all cases, the purpose of the research was clearly stated and the outcomes and the criteria used to measure those outcomes were well defined. Also, the measures used were valid and reliable which minimized the risk of detection bias. However, contrary to the studies assessed in question 1, the measures used to evaluate the constructs of interest were varied making comparability and interpretability among the studies difficult. Nonetheless, since the purpose of this section of the systematic review was find evidence of moderation or mediation rather than to assess the impact of moderators in specific relationships, the impact on the quality of the evidence was not significant as it could have been otherwise. Moreover, the diversity of measures used in the studies was expected since, as noted by Petticrew and Roberts (2006), considerable heterogeneity across studies in social research is a common occurrence when performing systematic reviews.

There were however several issues regarding risk of bias that affected the quality of the reviewed evidence. With the exception of Gratz et al. (2008) and McLaughlin et al. (2011), all studies presented potential problems with selection and attrition bias as none of the studies made clear how many participants were asked to take part and also the number or percentage of participants who did not conclude the assessment was omitted. Only three of the selected studies used a sample representative of the source population which lessened the risk of attrition bias. Other issues that



precluded these studies from obtaining better quality ratings were that six of the eight studies relied solely in the use of self-report measures, and the fact that none of them used random allocation of participants. Hence, as in the case of the studies in the first section of the review, while these issues affected the quality of the evidence presented, some of these problems that may be easily addressed in future studies.

#### ***2.4.3.8 Findings***

No studies were found that examined the use of Mentalization, Metacognition, or Theory of Mind as either mediator or moderator in relationships involving mental disorders. All but one study (Karreman & Vingerhoets) found evidence of either mediation or moderation effects of emotion regulation. However, Karreman and Vingerhoets study found evidence of the partial mediation of higher reappraisal (another hypothesized form of emotion regulation) in the relationship between secure attachment and well-being. Gratz and colleagues (2008) found that emotion regulation mediated the relationship between emotional abuse and BPD diagnostic. Rosenthal et al. and Cheavens et al. found that emotion regulation (thought suppression) fully mediated the relationship between negative affectivity and BPD symptoms/features. Sharp and colleagues found evidence of partial mediation effects of emotion regulation in the relationship between hypermentalizing and BPD features. The study conducted by McLaughlin's group found emotion dysregulation to be a mediator in the relationship between stressful life events and anxiety, and also in the relationship between stressful life events and depression. Regarding moderation, Hasking and colleagues found emotion regulation to be a moderator in the relationship between personality and self-injury, while Gratz's group (2008) found that affective dysfunction was a moderator in the relationship between emotional abuse and borderline personality features.

#### ***2.4.3.9 Limitations***

There were several limitations that affected the studies included in this review. First, all studies used self-report measures to examine the proposed variables, and for most of them, these were the only form of assessment. The use of self-report measures,

while still useful, should be part of a multi-method of assessment whenever possible (Achenbach, Krukowski, Dumenci, & Ivanova, 2005; Spector, 1994). To add to that, there was no consistency in the use of measures and a wide range of measures were used from one study to the next oftentimes to assess the same constructs. Second, all studies used correlational data and cross-sectional designs to examine the proposed variables. Hence, the ability of these studies to make inferences about causal relationships or directionality among variables was limited. Third, the generalizability of the studies was also limited as all but one group of researchers (Sharp et al., 2010) used non-clinical populations. In addition, some of the populations used in the studies were almost homogenous (e.g. the study by Gratz et al. [2008] used drug addicted individuals most of which were African American. Next, most of the studies in this review used the hierarchical multiple regression strategy of Baron and Kenny. The use of this approach has long been questioned as it has several short comings including low statistical power and invalid causal differences when applied to misspecified models (Rosopa & Stone-Romero, 2008). And last, since the research was limited to only certain types/strategies of emotion regulation (e.g. reappraisal and suppression), more research is needed using other less known types of emotion regulation (e.g. rumination, distraction, etc) in order to fully understand the interaction of emotion regulation and their impact in psychopathology.

#### **2.4.4 Conclusions**

The lack of empirical literature in the area of underlying mechanisms in the relationship between metacognition and mental disorders makes it difficult to draw any inferences. The only potential evidence relating to metacognitive processes was through “hypermentalizing” but as a predictor rather than mediator or moderator as it was found that the relationship between BPD features and hypermentalizing was partially mediated by emotion regulation. While the relationship between BPD traits and hypermentalizing was found to be statistically significant, no significant relationship was found between the inability to mentalize or undermentalizing and BPD features. The researchers concluded that mentalizing and emotion regulation are “separate but interacting difficulties in individuals with a vulnerability to BPD”.

Regarding emotion regulation, the results of this review suggest that emotion regulation does play a role as a mediator of relationships in psychopathology. In addition, emotion regulation may play an important role in understanding the working mechanisms of at least some mental disorders including BPD, depression and anxiety. Furthermore, related findings indicated that BPD traits may be heightened when thought suppression is used as an emotion regulation strategy, and that individuals who tend to suppress their thoughts more often than their peers are more likely to use more maladaptive ways to regulate emotion. Individuals who consider themselves “easily disturbed by emotional events” have a higher vulnerability to develop borderline personality traits.

Other related findings indicate that the relationship between secure attachment and well-being was partly moderated by higher reappraisal and resilience, while the relationship between insecure preoccupied attachment and negative effects on well-being were mediated by lower reappraisal and resilience. However, emotion regulation through suppression of expression did not appear to mediate the relationship between attachment and well-being. Similarly, emotion dysregulation mediated the relationship between stressful life events and anxiety and also mediated the relationship between stressful life events and internalising symptoms. There was also evidence, although not as strong, of the mediating role of emotion dysregulation in the relationship between stressful life events and depression. There were no differences in terms of gender and/or race/ethnicity in regards to the mediation effects investigated in this study; however, the effect appeared to be stronger among older adolescents.

However, the results of this review clearly indicate that more research is needed. At least fifty percent of the studies included in this review claimed to be the “first” empirical investigation examining particular relationships, all of which involved emotion regulation or comparable concepts, playing the role of either mediator or moderator.

#### **2.4.5 Final Summary of Results and Moving Forward**

The answers to the three questions proposed in this systematic review were as follow:

1. This systematic review found evidence of mediation and moderation effects in the relationship between childhood maltreatment and features associated with BPD.
2. The review of the literature showed no evidence in favour or against mediation or moderation effects in the relationship between attachment and features associated with borderline personality which means that further research is needed before any conclusions can be drawn.
3. This review found empirical support for the mediating and moderating role of emotion regulation. Moreover, evidence was found to support the role of suppression as mediator in relationships involving psychopathological constructs, as well as the role of reappraisal in the relationship between insecure attachment and well-being. However, there was a lack of empirical literature concerning the mediating/moderating role of metacognition in psychopathology which led to the conclusion that research is most needed in this area.

Concerning the proposed study that complements this systematic review, these findings are the most relevant as they provide a specific direction to follow. Before moving forward however, it is important to acknowledge the possibility that the stringent restrictions of the inclusion criteria may have led to shortfalls in the extensive literature search. Yet, the use of such rigorous criteria was necessary because of the need to focus on precise psychological mediators and explicit aspects of psychopathology.

The conclusions of this systematic review suggest that the use of emotion regulation as a mediator in the pursuit of understanding the working processes of mental disorders is appropriate. These findings also clarify the usefulness of emotion regulation versus all other forms of affective regulation as it applies to mental disorders since evidence of the role of suppression as an emotion regulation strategy

in the heightening of BPD traits was found. Furthermore, the evidence found regarding the role of reappraisal as a mediator was also important as it gives weight to Gross' conceptualization of emotion regulation which highlights the roles of suppression and reappraisal in psychopathology. For this reason, in moving forward with the research part of this project, the study of emotion regulation as a mediator in relationship to BPD will be based on Gross' theory. In addition, emotion regulation will be assessed with the measure developed by Gross and John (2003) which is rooted on this theory: the Emotion Regulation Questionnaire (ERQ).

Regarding the use of metacognition, the fact remains that metacognition (mentalization) has already been associated with BPD to the degree that there is a mentalization-based psychotherapeutic treatment (Mentalized Based Treatment [MBT]) that has shown positive results in the amelioration of BPD symptoms. Yet, the mechanisms through which this is possible remain unexplained. The results of this review indicated that there is no empirical evidence to either support or refute the use of metacognition as a mediator in psychopathology. Hence, in order to find evidence pointing to mechanisms that may contribute to the development of BPD features, further research is needed. Consequently, metacognition will be used in the research part of this study as a mediator, in the same way emotion regulation suppression and emotion regulation reappraisal will be used.

Similarly, the relationship between attachment and features associated with BPD has been under-investigated to the degree that no conclusions could be drawn from this review. For this reason, internal mechanisms in the relationship between insecure attachment and BPD and in the relationship between parental bonding and BPD and parental bonding will be researched. In addition, the direct relationships between insecure attachment and BPD and between parental bonding and BPD will also be explored.

And finally, given the fact that this review found evidence of internal mechanisms at work in the relationship between childhood maltreatment and BPD, further investigation will take place using emotion regulation suppression, emotion regulation reappraisal, and metacognition as mediators.

## 3 METHODS

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### 3.1 Recruitment

The study took place during the 2011-2012 University of Edinburgh academic year. Participants were recruited from several schools at The University of Edinburgh, Queen Margaret University, and several small colleges in the city of Edinburgh, Scotland. Specifically, twenty-one schools within the University of Edinburgh were contacted via email and asked to disseminate the survey among their undergraduate and graduate students. The email included: the survey (see Appendix 4), the ethical approval for the study from the School of Health in Social Sciences at The University of Edinburgh (see Appendix 5), the Research Participant Consent Form (see Appendix 6), the Participant Information Sheet (see Appendix 7), the Research Protocol (see Appendix 8) and a short introductory and invitational statement to be used when sending emails to the students (see Appendix 9). Only five schools within the University of Edinburgh agreed to circulate the survey, namely, the School of Chemistry, the School of GeoSciences, the School of Health in Social Science, the School of Informatics, and the Edinburgh College of Art. In addition, twelve other colleges and universities all based in Edinburgh were contacted (see Appendix 10 for a complete list of schools colleges and universities that were asked to participate in the study), and four of them agreed to distribute the survey among their students (Queen Margaret University, Leith School of Art, Jewel & Esk College, and Telford College). Since the invitation to the survey was distributed by administrators at the school, college or university, it was not possible for the researcher to determine the exact or even the approximate number of students that were invited to participate. Regarding the characteristics of the sample however, it can safely be assumed that the participants were a representative sample of university and college level student population in Edinburgh in regards to age, gender, race, and ethnicity. Participation in the study was voluntary and students were not remunerated for their involvement but those who completed the survey were given the opportunity to enter a prize draw with the chance to win an i-Pad.

### **3.2 Participants**

Surveys were obtained from 695 students; however 121 surveys were not included in the study because of incomplete data, leaving a total of 574 participants. Of these, 425 were females (74%) and 149 were males (26%). The age of the participants ranged from 17 to 64 years of age ( $M = 25.48$ ,  $SD = 8.34$ ). The majority of the participants (485; 84.5%) identified themselves as Caucasian, 34 (5.9%) as Asian, 19 (3.3%) as mixed race, 32 (5.6%) as other and 4 (0.7%) participants declined to answer. Over half of the participants were from the United Kingdom; however, people from 65 other countries also participated in the study.

### **3.3 Survey and Data Collection**

Each participant was asked to complete a survey that consisted of a battery composed of eight assessments or self-report measures (see Appendix 4) all of which are listed and described in the measures section 3.4. All measures were chosen because they had previously been used in research studies in similar areas of interest. However, it is important to note that to this researcher's knowledge, this is the first study in which all areas of interest have been researched in one study at the same time. Once the battery of assessments was constructed into a coherent survey, this was then transferred to Bristol Online Surveys (BOS), a web-based tool that enables researchers and other users to create online surveys. In addition to the essential battery of questions, a picture or a cartoon and a comment about human personality was added at the end of every measure. The reasoning behind this approach was to give participants a short break in between measures and thus increase the chances of them completing the survey. This break would also help participants to break their train of thought from one measure to the next. Once the survey was created and saved in the BOS database, BOS assigned a link which was included in the invitation to participate sent to all potential participants. Once a participant pressed the link, he/she was routed to the electronic page assigned by BOS. The survey consisted of a total of 218 questions. Before the core (self-report) questions, each participant was presented with a "Participant Information Sheet" composed of seven statements in which they were informed of the following:

1. General information about the study and the researcher
2. Specific instructions on how to complete the survey
3. Statement of confidentiality
4. Informed consent regarding the participant's right not to participate on the study
5. A statement regarding incentives
6. A statement about any possible drawbacks of participating in the survey (e.g., feeling upset because of the nature of the questions) and the participant's right/choice to terminate the survey at any time.
7. General information about ethical approval for the survey.

The next four items (Q.8 to Q.11) were demographic questions, and the last item (Q.218) asked participants who wanted to enter the prize draw for their contact details. The rest of the items (Q.12 to Q.217) were questions from the measures chosen for the study. Participants were given the option of ending the survey at any point without penalty.

### **3.4 Measures**

#### **3.4.1 Childhood Trauma Questionnaire (CTQ)**

The CTQ (Bernstein, D. P. & Fink, L., 1998; see Appendix 11) is a self-report inventory that identifies abuse and neglect and it can be used with adults and adolescents. The scale consists of 28 items that account for five sub-scales that measure dimensions of childhood maltreatment as follow: (1) emotional abuse (e.g. "I thought that my parents wished I had never been born"); (2) physical abuse (e.g. "I was punished with a belt, a board, a cord, or some other hard object"); sexual abuse (e.g. "someone tried to make me do sexual things or watch sexual things"); emotional neglect (e.g. "people in my family felt close to each other"); and physical neglect (e.g. "I didn't have enough to eat"). Each item is related on a five-point Likert scale with a response format ranging from 1 (never true) which would indicate that abuse and/or neglect never happened, to 5 (very often true) which would indicate abuse and/or neglect was a common occurrence; thus, allowing for the identification



of the severity (low, moderate, severe) of the abuse and/or neglect. The CTQ also includes a minimisation denial scale which allows the researcher to identify individuals who may minimize their past situations of abuse and/or neglect which is done by assessing a respondent's answers to items 10 ("there was nothing I wanted to change about my family"), 16 ("I had a perfect childhood"), and 22 ("I had the best family in the world"). According to the authors, the answers to these questions, in addition to an addition/subtraction of points to the expected scores, would indicate a respondent's tendency (or lack of it) to give exaggerated responses. The CTQ has been found to have good convergent and discriminant validity, and it has also been found to be reliable with high internal consistency scores (Bernstein, Ahluvalia, Pogge, & Handelsman, 1997).

In addition to the childhood maltreatment sub-scales, the CTQ consists of one sub-scale of emotional neglect, and one sub-scale of physical neglect. Data was collected for all sub-scales; however the neglect sub-scales were not included in the study. The main statistical reason for excluding the neglect sub-scales from the study was due to reliability. Specifically, the emotional neglect sub-scale has been found to have a high degree of association with other measures of childhood maltreatment (rather than neglect), and to have a serious overlapping problem with the emotional abuse sub-scale of the CTQ (Baker & Festinger, 2011). Problems have also been found regarding the factorial structure of the CTQ that have a direct impact on the neglect sub-scales; specifically, the physical neglect sub-scale does not appear to be a stable factor (Gerdner & Allgulander, 2009; Villano et al., 2004). Furthermore, both of the neglect sub-sub-scales have been found to relate moderately to all other maltreatment sub-scales part of the CTQ (Baker & Festinger, 2011). For other non-statistical reasons for excluding neglect from this study please refer to section 1.4.2.

According to Bernstein and Fink (1998) the CTQ has good internal consistency. Several samples of participants (clinical and non-clinical) were used in the original assessment of the measure. The Cronbach alpha coefficients were computed for all sub-scales. The reported reliability coefficients for the abuse scales were as follow: for the emotional abuse scale results ranged from .83 to .94 (median = .89); for the

physical abuse sub-scale results ranged from .57 to .92 (median = .82); and the results for the sexual abuse sub-scale ranged from .72 to .96 (median = .92). It is important to note that the some of the lowest Cronbach alpha scores in the physical and the sexual abuse sub-scales (.78 and .72 respectively) were from a sample of college students ( $n = 92$ ) similar to the sample used for this research project. In the current study the reported reliability coefficients for the abuse sub-scales were as follow: for the emotional abuse scale the result was .84; the result for the physical abuse sub-scale was .83; and the result for the sexual abuse sub-scale was .95 (see Table 16 for further psychometric information).

Berstein and Fink (1998) also reported the CTQ has good construct validity as indicated by the results of exploratory and confirmatory factor analyses with three different samples. The researchers used two different goodness of fit indexes to assess the proposed sub-scales of the CTQ, the Satorra-Bentler chi-square (S-B  $\chi^2$ ) and the Robust Comparative Fit Index (RCFI). Only results for the full measure were provided. The results for the three different samples were as follow: Sample 1 S-B  $\chi^2$  (263,  $N=378$ ) = 506.39 and RCFI = .91; Sample 2 S-B  $\chi^2$  (264,  $N=396$ ) = 546.31, and RCFI = .94; and Sample 3 S-B  $\chi^2$  (197,  $N=899$ ) = 398.80, and RCFI = .96. In the current study, the results of confirmatory factor analysis employing the Weighted Least Squares Estimator (WLSMV- Please see section 3.6 below for a full explanation behind the rationale of using this estimator) resulted in excellent overall fit as follow: the emotional abuse sub-scale (RMSEA=.04, CFI=.99, TLI=.98); the physical abuse sub-scale (RMSEA=.04, CFI=.99, TLI=.98); and the sexual abuse sub-scale (RMSEA=.04, CFI=.99, TLI=.98).

### **3.4.2 Emotion Regulation Questionnaire (ERQ)**

The ERQ (Gross & John, 2003; see Appendix 12) is a 10-item self-report inventory designed to measure two specific constructs related to emotion control: expressive suppression and cognitive reappraisal. The ERQ consists of two sub-scales that account for the two above mentioned constructs. Four of the items in the inventory are designed to measure expressive suppression (e.g. “I keep my emotions to myself”), and the remaining six items measure cognitive reappraisal (e.g. “I control

my emotions by changing the way I'm thinking about the situation"). Each item is designed on a seven-point Likert scale with responses ranging from 1 (strongly disagree), which would indicate that neither suppression nor reappraisal (depending on the question) is frequently used, to 7 (strongly agree), which would indicate that suppression or reappraisal (again, depending on the question), is frequently used. High scores in the ERQ indicate a more frequent use of suppression and/or reappraisal as emotional regulation strategy. The ERQ has been shown to be valid and reliable with a high internal consistency and factor structure (Melka, Lancaster, Bryant, & Rodriguez, 2011). Since both expressive suppression and cognitive reappraisal constructs were of interest to the present study, both sub-scales of the ERQ were used. In order to meet the purposes of this study and following the suggestions by the authors, each of the sub-scales was considered an independent construct. In addition, it is relevant to note that the sub-scales were never used together, or in the same model at the same time.

Gross & John (2003) initially assessed the properties of the ERQ with four separate samples of undergraduate students. The Cronbach alpha coefficients were computed for both sub-scales and the resulting values were .80, .77, .75, and .82 for the cognitive reappraisal sub-scale, and .73, .68, .75, and .76 for the cognitive suppression sub-scale. In addition, Gross and John reported a good model fit for both scales. Other studies have corroborated the psychometric properties of the ERQ. Enebrik, Björnsdotter and Ghaderi (2013) found that both sub-scales of the ERQ had good internal consistency (reappraisal = .81, and suppression = .73) using a sample of Swedish parents. The results of a CFA also indicated the data was an acceptable good fit to the data (RMSEA = .08, CFI = .91, and GFI = .93) for a two-dimensional emotional regulation model. Wiltink et al. (2011) reported similar results using a community sample ( $\chi^2(41) = 662.95, p < .001$ ; RMSEA = .078; SRMR = .064; CFI = .95). In the present study, the Cronbach alpha coefficients were computed for both sub-scales and the resulting values were .84 for the cognitive reappraisal sub-scale and .76 for the cognitive suppression sub-scale. In addition, the results of a CFA resulted in a good overall fit for the cognitive reappraisal sub-scale (RMSEA = .06, CFI = .93, and TLI = .91), and also a good overall fit for the

cognitive suppression sub-scale (RMSEA = .06, CFI = .91, and TLI = .89; see Table 16 for further psychometric information).

### **3.4.3 Metacognition Questionnaire-Short Form (MCQ-30)**

The MCQ-30 (Wells & Cartwright-Hatton, 2004) is a 30-item short form of the MCQ. The MCQ-30 (see Appendix 13) is a multidimensional instrument for assessing individual differences in metacognitive beliefs, judgements, and monitoring tendencies which is considered to be appropriate for use in clinical research. The MCQ-30 is composed of five sub-scales assessed by 30 items. The five subscales measure the following dimensions of metacognition: (1) cognitive confidence (e.g. “I do not trust my memory”); (2) positive beliefs about worry (“worrying helps me to solve problems”), (3) cognitive self consciousness (e.g. “I pay close attention to the way my mind works”); (4) negative beliefs about worry (e.g. “my worrying is dangerous for me”); and (5) need to control thoughts (e.g. “it is bad to think certain thoughts”). Each item is related on a four-point Likert scale with a response format ranging from 1 (do not agree) to 4 (agree very much) which would indicate the level of agreement with the statements in the scale. The MCQ-30 has been found to be valid and reliable with a good convergent validity and a high internal consistency (Wells & Cartwright-Hatton, 2004). As above noted, the purpose of the five sub-scales of the MCQ-30 is to assess metacognition. In four of those sub-scales (positive beliefs about worry, negative beliefs about worry, beliefs about cognitive confidence, and beliefs about the need to control thoughts), the assessment of metacognition is done implicitly as these sub-scales refer to the content of cognitive processes (e.g. “I have poor memory, I need to worry in order to work well, or I could make myself sick with worrying”); conversely, the assessment of metacognition in the remaining sub-scale (cognitive self-consciousness) is done explicitly (e.g. “I constantly examine my thoughts”; Pérez Nieto, Redondo Delgado, León Mateos, & Bueno, 2010).

According to Wells and Cartwright-Hatton (2004) the MCQ-30 has good internal consistency, with a total Cronbach alpha coefficient reported of .93 for all sub-scales, and a Cronbach alpha coefficient of .92 for the cognitive self-consciousness sub-

scale. In the current study the Cronbach alpha coefficient was .90 for all sub-scales and .85 for the cognitive self-consciousness sub-scale.

In addition, the researchers reported the MCQ-30 has good construct validity indicated by the results of confirmatory factor analysis employing the maximum likelihood estimation (MLI) technique which resulted in an acceptable overall fit (RMSEA=.06, CFI=.91, SRMR= .04). In the current study, the results of confirmatory factor analysis employing the Weighted Least Squares Estimator also resulted in an acceptable overall fit (RMSEA=.06, CFI=.92, TLI=.91; see Table 16 for further psychometric information).

Most theorists in the area of metacognition are in agreement that even though metacognition is a “multifaceted” concept, it can be separated into two very distinct aspects, metacognitive knowledge and metacognitive regulation (Spada, Nikčević, Moneta, & Wells, 2007). According to Wells (2000), metacognitive knowledge refers to “the general beliefs and theories that individuals have about their own cognitions and about task factors or learning strategies that affect it”; while metacognitive regulation refers to “a range of executive functions, such as the allocation of attention, monitoring, checking, planning, and detection of errors in performance”. Since many of the aspects of metacognitive regulation are already accounted by other sub-scales used in this study (attentional sub-scale and the motor sub-scale of the BIS-11), only the three sub-scales in the MCQ-30 associated with metacognitive knowledge (cognitive confidence, positive beliefs about worry, and need to control thoughts) were used even though data concerning the full measure were collected in the survey.

#### **3.4.4 Relationship Scale Questionnaire (RSQ)**

The RSQ (Griffin & Bartholomew, 1994; see Appendix 14) is a self-report measure intended to be a continuous measure of adult attachment. The scale consists of 18 short statements describing different styles or attachment prototypes in close relationships. Each statement is related on a five-point Likert scale with a response format ranging from 1 (not at all like me) to 5 (very much like me) when choosing an

item that would best describe the respondent's participant's style in close relationships. The four attachment prototypes are: secure attachment (e.g. "I find it easy to get emotionally close to others"); dismissive attachment (e.g. I am comfortable without close emotional relationships"); fearful attachment (e.g. "I find it difficult to depend on others"); and preoccupied attachment (e.g. "I worry that others don't value me as much as I value them"). After an exhaustive search, it was concluded that the normative data for this scale had not been made available by the authors.

Regarding the present study, the RSQ was used to define the general concept of insecure attachment. The scale is composed of four sub-scales, three of which describe different types of insecure adult attachment (fearful, preoccupied and dismissing insecure attachment), and one scale that describes secure adult attachment. However, as noted by Bartholomew (2005) the RSQ is meant to be used as a "continuous measure of attachment" as it is not standardised to be used as a "categorical measure of attachment". Therefore only a general type of insecure attachment that included all three forms of adult insecure attachment was used in this study. Also, since secure attachment is not usually associated with psychopathology, the items relating to secure attachment were left out of the study. The Cronbach alpha coefficient for the present study was .901, and the results of confirmatory factor analysis indicated a good fit to the data (RMSEA = .04, CFI=.92, TLI=.91; see Table 16 for further psychometric information).

#### **3.4.5 Parenting Bonding Instrument (PBI)**

The PBI (Parker, Tupling, & Brown, 1979; see Appendix 15) is a retrospective self-report measure intended to assess "fundamental parental styles" during the first 16 years of life of an individual. The scale consists of 25 items that account for two bipolar factors (factors with two dimensions) or sub-scales that measure perceived maternal and parental care and overprotection. Each item is designed as a 4-point Likert scale with a response format ranging from 1 (very likely) to 4 (very unlikely) indicating various attitudes and behaviours from parents. The respondent completes one form for each parent. The care dimension ranges from parental affection,

warmth and empathy (high scores) to parental coldness, indifference and rejection (low scores). The overprotection dimension ranges from intrusiveness and infantilization (high scores) to the detached promotion of independence (low scores). The two-factor structure of the PBI had been questioned in several studies (Gomez-Beneyto, Tomas, Aguilar, & Leal, 1993; Kendler, Sham, & MacLean, 1997; Murphy, Brewin, & Silka, 1997; Uji, Tanaka, Shono, & Kitamura, 2006; etc.), and while there is common agreement in that the original two-factor structure has good psychometric properties as it has been found to be both valid and reliable, many have argued the original model can be improved by altering the factorial model and/or the item distribution. For the purpose of this study, the four-factor distribution model as proposed by Uji, Tanaka, Shono and Kitamura (2006) was used as, according to Uji and colleagues, replacing Parker's two-factor bipolar structure with a four-factor unipolar structure makes statistical sense and improves model fit. The sub-scales as proposed by Uji and colleagues are: care (e.g. spoke to me in a warm and friendly voice); indifference (e.g. did not help me as much as I needed); overprotection (e.g. did not want me to grow up); and autonomy (e.g. let me do those things I liked doing). The four-factor structure, just like the two-factor structure, has good psychometric properties and has been found to be both valid and reliable across various age, gender, and racial groups (Suzuki & Kitamura, 2011). The fit indices of different proposed models have been reported. The two-factor model by Parker and colleagues (1979) reported an acceptable overall fit (RMSEA = .05, CFI = .09, and SRMR = .11). Cubis et al. (1989) reported an acceptable overall fit for their three-factor model (RMSEA = .06, CFI = .86, and SRMR = .11). Uji and colleagues reported a good overall fit for their four-factor model (RMSEA = .06, CFI = .89, and SRMR = .07). And finally, Jianghong et al. (2011) reported a good overall fit for their 4-factor model (RMSEA = .05, CFI = .85, and SRMR = .05). A large number of studies have also shown the PBI has a good internal consistency with reported Cronbach alpha coefficients ranging from .78 to .93 for the maternal care sub-scale, and from .72 to .92 for the paternal sub-scale.

In the current study the Cronbach alpha coefficient was .86 for the maternal sub-scale. When the subscales relevant to this study were investigated separately, the

Cronbach alpha coefficient for the maternal indifference sub-scale was .86, and .84 for the maternal overprotection sub-scale. The results of confirmatory factor analysis indicated a good overall fit for the maternal indifference sub-scale (RMSEA = .033, CFI=.96, TLI=.95), and also a good fit for the maternal overprotection sub-scale (RMSEA=.04, CFI=.95, TLI=.94; see Table 16 for further psychometric information).

**Table 16.** *Psychometric properties of scales (based on studied sample)*

Scale	Items (N)	Cronbach's $\alpha$	RMSEA	CFI	TLI
<b>CTQ Emotional Maltreatment</b>	5	.847	.04	.99	.98
<b>CTQ Physical Maltreatment</b>	5	.833	.04	.99	.98
<b>CTQ Sexual Maltreatment</b>	5	.952	.04	.99	.98
<b>ERQ Suppression</b>	4	.759	.06	.91	.89
<b>ERQ Reappraisal</b>	6	.835	.06	.93	.91
<b>MCQ All Factors</b>	29	.901	.06	.92	.91
<b>RSQ Insecure Attachment</b>	13	.901	.04	.92	.91
<b>PBI Mother Indifferent</b>	6	.863	.03	.96	.95
<b>PBI Mother Overprotective</b>	7	.839	.04	.95	.95



### **3.4.6 Inventory of Interpersonal Problems-Short Circumplex (IIP-SC)**

The IIP-SC (Soldz, Budman, Demby, & Merry, 1995; see Appendix 16) is a 32-item self-report measure intended to be a measure of interpersonal difficulties. The IIP-SC is designed as a five-point Likert scale with a response format ranging from 0 (not at all) which would indicate no distress at all, to 5 (extremely) which would indicate a level of extreme distress related to interpersonal difficulties. The IIP-SC consists of 8 sub-scales: domineering (e.g. “I am too aggressive toward other people”); vindictive (e.g. “I find it difficult to put somebody else’s needs before my own”); cold (e.g. “I find it difficult to feel close to other people”); socially avoidant (e.g. “I find it difficult to socialize with other people”); non-assertive (e.g. “I find it difficult to be firm when I need to be”); overly accommodating/exploitable (e.g. “I open up to people too much”); overly nurturing/self sacrificing (e.g. “I try to please other people too much); and intrusive/needy (e.g. “I tell personal things to people too much”).

The IIP-SC is a short form of the IIP, a 127-item valid and reliable inventory designed to assess self interpersonal distress. The IIP-SC was constructed to be used in research and in situations where the patient needs to be screened in a short period of time. The IIP-SC has been found to be highly correlated with the IIP and has shown similar treatment responsiveness, thus, it has been deemed to be an appropriate substitute of the full measure (Soldz, Budman, Demby, & Merry, 1995). The IIP-SC has also shown it has good construct validity, and has been validated for its use with university student populations as it can clearly differentiate between college students and clinical populations (Hopwood, Pincus, DeMoor, & Koonce, 2008). For the purpose of the present study, only four of the eight sub-scales of the IIP-SC were used: the vindictive/self-centred sub-scale, the overly accommodating sub-scale, the self-sacrificing sub-scale, and the intrusive/needy sub-scale as the available research suggests that borderline personality outpatients tend to report interpersonal problems associated to the relevant areas covered by these scales (Hilsenroth, Menaker, Peters, & Pincus, 2007). Confirmatory Factor Analyses with the data gathered for the current study resulted in a good overall fit for the vindictive/self-centred sub-scale (RMSEA=.05 CFI=.93, TLI=.92), a borderline, but

acceptable, overall fit for the overly accommodating sub-scale (RMSEA=.06 CFI=.91, TLI=.89), a good overall fit for the self-sacrificing sub-scale (RMSEA=.04 CFI=.95, TLI=.94), and a good overall fit for the intrusive/needy sub-scale (RMSEA=.06 CFI=.92, TLI=.91).

Hopwood, Pincus, DeMoor, and Koonce (2008) provided structural validity and reliability for the IIP-SC in two samples of undergraduate students. The authors reported that the IIP-SC had showed a good internal consistency with a total Cronbach alpha coefficient reported of .94 for their first sample which included all sub-scales (n = 397), and .89 for their second sample (n = 872). In addition, the alpha coefficients for the individual sub-scales were reported as follow: the domineering sub-scale (.73) for the first sample, and (.69) for the second sample; the vindictive/self centered sub-scale (.77) for the first sample, and (.66) for the second sample; the cold/distant sub-scale (.85) for the first sample, and (.83) for the second sample; the socially avoidant sub-scale (.86) for the first sample, and (.83) for the second sample; the non-assertive sub-scale (.87) for the first sample, and (.81) for the second sample; the overly accommodating sub-scale (.81) for the first sample, and (.72) for the second sample; the self-sacrificing sub-scale (.75) for the first sample, and (.69) for the second sample; and the intrusive/needy subscale (.70) for the first sample, and (.75) for the second sample.

In the current study the Cronbach alpha coefficient when all sub-scales were included was .90, and the alpha coefficients for the individual sub-scales were as follow: the domineering sub-scale (.74); the vindictive/self centered sub-scale (.87); the cold/distant sub-scale (.85); the socially avoidant sub-scale (.86); the non-assertive sub-scale (.83); the overly accommodating sub-scale (.75); the self-sacrificing sub-scale (.79); and (.76) for the intrusive/needy subscale (see Table 17 for further psychometric information).

### **3.4.7 Barratt Impulsiveness Scale (BIS-11)**

The BIS-11 (Patton et al., 1995; see appendix 17) is a 30-item self-report measure intended to assess a participant's general impulsiveness from a "multi-factorial"

perspective. The measure consists of three sub-scales (or second order factors) and six first order factors. The three subscales are: (1) attentional impulsiveness (inattention and cognitive instability); (2) motor impulsiveness (spontaneous actions); and (3) non-planning impulsiveness (lack of forethought). Specifically, the BIS-11 assesses impulsiveness in six different areas: (1) attention (e.g. “I don’t pay attention”); (2) cognitive instability (e.g. “I have racing thoughts”); (3) motor (e.g. “I do things without thinking”); (4) perseverance (e.g. “I am a steady thinker”); (5) self-control (e.g. “I plan tasks carefully”); and (6) cognitive complexity (e.g. “I save regularly” ). First order factors 1 and 2 comprise the attentional sub-scale, factors 3 and 4 constitute the motor impulsiveness sub-scale, and factors 5 and 6 comprise the non-planning impulsiveness sub-scale. Each item is designed as a four-item Likert scale with a response format ranging from 1 (rarely/never) which would indicate little to no engagement to 4 (almost always/always) which would indicate an almost certain level of engagement in a given thought or activity. The BIS-11 is a valid and reliable measure as it has been found to have a good convergent validity and a high internal consistency (Patton, Stanford, & Barratt, 1995).

A systematic review conducted by Vasconcelos, Malloy-Diniz, and Correa (2012), found that 16 of 17 studies included in the review, all of which were published between 1995 and 2011, had shown the BIS-11 had good internal consistency with reported Cronbach alpha coefficients ranging from .69 to .83. However, the review also found that a number of studies investigating the structure of the BIS-11 had found many discrepancies regarding the internal structure of the measure. Regarding this issue, the authors have pointed out that many of the studies had been done in countries where the first language was not English and with participants who may have been culturally different than those from the original sample used by Barratt and colleagues. According to Vasconcelos and colleagues, it has long been suspected that cultural issues may affect the distribution of factors even when people speak the same language. Nevertheless, it is important to point out that there is no consensus on the authors’ assertions as comparisons between populations that share the same language have provided mixed results. In addition, the authors have also alluded to the fact that there has not been uniformity in the way the data has been

processed as some studies have used exploratory factor analysis while others have used confirmatory factor analysis, etc. In summary, while the highlighted dimensional issues of the BIS-11 are important, the clinical and research utility of the measure must also be noted as, regardless of all issues above stated, the BIS-11 still allows for the detection and differentiation of impulsive behaviour.

In the present study, the Cronbach alpha coefficient when all the scales were included was .83 while the alpha coefficients for the individual scales were as follow: the attentional impulsiveness sub-scale (.74); the motor impulsiveness sub-scale (.61); and the non-planning impulsiveness sub-scale (.73). In addition, the results of a CFA resulted in a fair overall fit for the full measure (RMSEA = .07, CFI = .90, and TLI = .89). The results also indicated a good overall fit for the attentional impulsiveness sub-scale (RMSEA = .04, CFI = .91, and TLI = .90), a borderline overall fit for the motor impulsiveness sub-scale (RMSEA = .07, CFI = .89, and TLI = .87), and a good fit for the non-planning impulsiveness sub-scale (RMSEA = .06, CFI = .90, and TLI = .89; see Table 17 for further psychometric information).

It is important to note that the non-planning sub-scale of the BIS-11 was not used in the present study as the individual items included in this sub-scale did not appear to describe the characteristic difficulties of BPD in the areas of impulsivity and risk taking as well as the items that comprise the attentional impulsiveness and the motor impulsiveness sub-scales.

#### **3.4.8 Hospital Anxiety and Depression Scale (HADS)**

The HADS (Zigmond & Snaith, 1983; see Appendix 18) is a 14-item self-report measure intended to assess for depression and anxiety. The scale consists of two sub-scales (7-item each): (1) depression, reflecting a state of anhedonia (e.g. “I have lost interest in my appearance”); and (2) anxiety, reflecting a state of generalized anxiety (e.g. “worrying thoughts go through my mind”). Each item is designed on a four-point Likert scale with a response format ranging from 0 (indicating an absence of symptoms), to 3 (indicating a very high presence of symptoms). It is important to note that the HADS does not assess for somatic complaints. A total score of 42 (21

per scale) is possible, with higher scores indicating a higher level of anxiety and/or depression. The HADS has consistently been found to be valid and reliable in the assessment of both anxiety and depression in psychiatric and general populations (Bjelland, Dahl, Haug, & Neckelmann, 2002). Both sub-scales were used in the present study.

The HADS has been found to have good internal consistency as measured by the Cronbach alpha coefficient in numerous studies. Results for the anxiety sub-scale of the HADS in several studies with a diversity of population samples have ranged from .76 to .90, and from .80 to .90 for the depression sub-scale (Moorey et al., 1991; Mykletun, Stordal, & Dahl, 2001; Lisspers, Nygren, & Soderman, 1997; Stordal et al., 2001). In the current study the Cronbach alpha coefficient for the anxiety sub-scale was .83, and .78 for the depression sub-scale.

Issues with the factor structure of the HADS have been long been discussed in the literature as there appears to be a lack of consistency between studies (Coyne & van Sonderen, 2012). The HADS was originally intended to be a measure of two dimensions, anxiety and depression, and the use of the HADS as a two-dimensional measure has been supported by several studies with clinical and non-clinical populations (Gough & Hudson, 2009; Moorey et al, 1991; Roberts, Bonnici, Mackinnon, & Worcester, 2001; etc.). However, research has also found support for the use of the HADS as a one-dimensional scale of mental distress (Cosco, Doyle, Watson, Ward, & McGee, 2012; Forjaz, Rodriguez-Blazquez, & Martinez-Martin, 2008; Razavi, Delvaux, Farvacques, & Robaye, 1990; etc.), and more commonly, as a tri-dimensional scale (Dunbar, Ford, Hunt, & Der, 2000; Hunt-Shanks, Blanchard, Reid, Fortier, & Cappelli, 2010; Schönberger & Ponsford, 2010; etc.). The use of the tri-dimensional factor structure implies the addition of a negative affectivity in addition to the anxiety and depression sub-scales. It has been suggested this third sub-scale would explain the association between anxiety and depression consistently found in the literature (Norton, Cosco, Doyle, Done, & Sacker, 2013).

Regarding this study, some of the issues noted in the literature concerning construct validity were present. More specifically, the results of a confirmatory factor analysis

indicated a poor overall fit for the anxiety scale (RMSEA = .09), yet, the results also indicated a good overall fit for the depression scale. Although, in reviewing the output data, it became obvious that some of the scale items were not loading on either sub-scale. Therefore, an exploratory factor analysis was performed confirming that when using the current sample of college and university students, the HADS operated better as a tri-dimensional rather than a two-dimensional measure. As a result, and after carefully analyzing the factor loadings, the rest of the data output, and taking into consideration the main purpose of this study, the decision was made to drop item 7 (item 28 in the survey) from the anxiety subscale. Item 7 (I can sit at ease and feel relaxed) is the item most often mentioned in other studies that agree with a tri-dimensional approach as not belonging in either sub-scale. Once the above mentioned item was removed, a new confirmatory factor analysis was performed for both sub-scales using the WLSMV estimator. The results indicated a good overall fit for both sub-scales as follow: anxiety (RMSEA=.06, CFI=.99, TLI=.98); and depression (RMSEA=.05, CFI=.99, TLI=.98; see Table 17 for further psychometric information).

As a final note, other item in the HADS that appeared to fit better in a third sub-scale were item 9 (30 in the survey) from the anxiety subscale, and items 8 and 10 (29 and 31 in the survey) from the depression scale. CFAs were performed removing all of these items from their respective scales and the model fit of both scales went from good to excellent as RMSEA dropped below .03 in both scales. However, the literature is not clear regarding items 29 and 30, and while there is some support for the elimination of item 31, it is not as conclusive as that for item 7. In the end, taking into consideration that the model fit for both models was good after removing item 7; the decision was made to leave all other items intact.

**Table 17.** *Psychometric properties of scales (based on studied sample)*

Scale	Items (N)	Cronbach's $\alpha$	RMSEA	CFI	TLI
<b>IIP-SC Overly Accommodating</b>	4	.752	.08	.91	.89
<b>IIP-SC Self-Sacrificing</b>	4	.792	.04	.95	.94
<b>IIP-SC Intrusive/Needy</b>	4	.761	.06	.92	
<b>BIS Full Measure</b>	30	.835			
<b>BIS Attentional Impulsiveness</b>	8	.743	.04	.91	.90
<b>BIS Motor Impulsiveness</b>	6	.701	.07	.89	.87
<b>HADS Anxiety</b>	7	.836	.06	.99	.98
<b>HADS Depression</b>	7	.780	.05	.99	.98

### 3.5 Composite of Borderline Personality Disorder Features

The latent construct of Borderline Personality Disorder Traits (BPDT) built for this study was measured by several sub-scales from the following measures: the HADS, the IIP-SC, and the BIS-11 (see section 3.4 for full description of measures). The construct adhered closely to the proposed alternative criteria for the diagnosis of BPD laid out in section III of the DSM-5. Specifically, two of four major areas related to personality functioning, empathy and intimacy, were accounted by the self-sacrificing and the intrusive/needy sub-scales of the IIP-SC respectively. In addition, five of the seven pathological personality traits, anxiousness, separation insecurity, depressivity, impulsivity, and hostility, were also accounted by the anxiety sub-scale of the HADS, the overly accommodating subscale of the IIP-SC, the depression sub-scale of the HADS, the attentional and the motor sub-scales of the BIS, and the vindictive/self-centered sub-scale of the IIP-SC respectively. In all, both of the HADS subscales, four of seven IIP-SC sub-scales, and two of the three sub-scales of the BIS were used. The Cronbach alpha coefficient when all the sub-scales above listed were included was .87. In addition, the results of a CFA resulted in a good fit for the full measure (RMSEA = .04, CFI = .95, and TLI = .94; see Table 18 for further psychometric information). However, it is important to note the lack of construct validity given the developmental stage of this “measure of traits”, and also given the developmental stage of the construct itself, as it has not gain full acceptance by the American Psychiatric Association as a whole despite the strong empirical evidence behind it.

**Table 18.** *Properties for the BPD composite*

Scale	Items (N)	Cronbach's $\alpha$	RMSEA	CFI	TLI
<b>BPD Composite</b>	38	.867	.04	.95	.94



### **3.6 Data Preparation and Processing**

Calculations were performed using MPlus version 6.12 (Muthen & Muthen, 1988-2010) which is a special purpose statistical software package with a wide variety of analysis capabilities including structural equation modelling. In addition, IBM Statistical Product and Service Solutions (IBM SPSS) version 20 was used to prepare and convert the raw data obtained from BOS to a workable format for use in MPlus and to perform several other operations such as reversing scale items, checking for data distribution, missing data, etc.

As above stated, a total of 695 students participated in the study. However, 121 surveys were missing more than 90% of the data. In many of those surveys the participants did not go beyond the consent questions, but were still recorded as participants in the survey by BOS. Many other participants did start to answer the survey, but they did not go past the first questions of the ERQ which was the first measure in the survey. Hence, the incomplete data belonging to those participants was manually removed from the study leaving 515 fully completed surveys and 59 surveys with just some missing data for a total of 574 surveys. Specifically, regarding the surveys of the 59 participants with some missing data, while all 59 participants successfully completed the survey, they missed answering one or more questions in the survey. For example, participants whose father had not been part of their lives ( $N=4$ ) did not answer the father sub-scale of the PBI. It is important to note however that none of the surveys belonging to these 59 participants exhibited blatant disregard in answering the survey, and for the most part, it appeared the majority of the unanswered questions were either overlooked by the individual participant, or the BOS system failed to register the answers.

A data check for missing values was performed in SPSS for a file that included all 574 participants. The results indicated that 7.3% of the data in this file was missing (see Appendix 19). According to Cohen and Cohen (as cited in Tsikrikis, 2005), even though there are no clear guidelines regarding the amount of missing data that is acceptable on a given variable or sample data, having 5% or less of the data missing is ideal, yet 10% or less of the data missing is still acceptable. In this case,

since the 7.3 % was still within the suggested acceptable values, the default missing data estimation (pairwise present) for the Weighted Least Squares Means and Variance Adjusted (WLSMV) estimation method in Mplus was used as it is the method recommended when working with categorical data. However, in order to make sure this was the correct decision, three experimental models were tested to compare results of a data file using the listwise deletion method against results of a data file using the multiple imputations method. The results of both tests in all three experimental models showed very similar results indicating that the use of pairwise present deletion would not significantly affect the final results.

All the models and sub-models constructed for this study were estimated using the WLSMV method as it is the recommended estimation method when a model contains categorical observed outcomes (Muthen, 2011; Muthen & Muthen, 1998-2012) as was the case for all models in this study. Even though it is a statistical fact that likert scales provide categorical data, and therefore no specific reason for treating this data as categorical should be necessary (Muthen, 2008; Muthen & Kaplan, 1985), the literature is not very clear on this matter. As a rule of thumb, some authors have suggested that data from likert scales should be treated as continuous if the scale has 7 or more categories (ideally), but allowances can be made for scales that have five or more categories (Carifio & Perla, 2007). In the case of this study, taking into consideration Muthen (2008) and Muthen and Kaplan (1985) assertions, and since 50% of the scales used had just 4 categories, three scales had 5 categories, and only one scale had 7 categories, it was decided to treat the data as categorical.

In order to test if the data was normally distributed, the Kolmogorov-Smirnov and the Shapiro-Wilk tests of normality were performed in SPSS. The results (see Appendix 20) indicated that every single question or variable in the survey significantly deviated from normal distribution in both tests as the *P*-values were significant ( $P = .000$ ) throughout. If the significance value on either test had been greater than 0.05 for a given variable it would have indicated the data was normally distributed (for that specific variable). According to Schumacker and Lomax (2010),

solutions to this problem include alternative methods of estimation such as Weighted Least Squares (WLS) and bootstrapping. The Maximum Likelihood Estimation with Robust Standard Errors (MLR) method in Mplus produces parameter estimates that are robust to non-normality of data and is considered the best approach to deal with data that is not normally distributed. However, MLR is an estimator designed to be used with continuous variables and cannot be applied to categorical data. For this reason, WLSMV was the estimator chosen for this study. It is relevant to mention that while WLSMV is not robust to non-normality, the parameters estimated produced by WLSMV will be the same as those produced by MLR, yet the standard errors will differ (Muthen, 2011). Hence, in order to account for this problem, the Bootstrap option in Mplus was used in combination with the WLSMV estimator.

### **3.7 Structural Equation Modelling**

According to Russell, Kahn, and Altmier (1998) the analysis of linear models with traditional approaches such as t-tests, analysis of variance, analysis of covariance, etc. has several limitations that may directly impact what could potentially be learnt from these models. Many of these limitations may be overcome by using structural equation modelling procedures with latent variables. Structural Equation Modelling (SEM) is an advantageous procedure appropriate for the management of cross-sectional data for inferential purposes as it allows the testing of theories involving a non-straightforward pattern of relationships (Mayet, Legleye, Chau, & Falissard, 2010). Structural Equation Modelling conveniently allows for the performance of multiple linear regressions simultaneously with added flexibility that permits a variable to be predictive in one equation, and predicted in another equation (Schumacker & Lomax, 2010). Structural Equation Modelling is the grouping of various statistical techniques that allow researchers to examine complex relationships among variables (Ullman, 2006). It is an extension of General Linear Modelling (GLM) techniques such as Analysis of Variance (ANOVA) and multiple regression analysis (Lei & Wu, 2007). Structural Equation Modelling is well suited for theory testing and theory development as it allows for the use of exploratory modelling as well as confirmatory modelling relationships (Mayet, Legleye, Chau, & Falissard, 2010).

Using SEM has several advantages. First, it allows for the exploration of multiple relationships at the same time which is one of the main limitations of other multivariate techniques (Bollen & Long, 1993). Second, SEM can be used with several different types of data including experimental, non-experimental, longitudinal, and cross-sectional data (Lei & Wu, 2007). And last, SEM allows for the use of latent variables (Ullman, 2006). Latent variables are constructs that cannot be observed directly but can be inferred from observed variables. Observed variables (also known as measured and indicator variables) can be measured directly with the use of tests, surveys, etc. (Lei & Wu, 2007).

Structural Equation Modelling is usually divided into two complementing parts: the measurement model and the structural model. A model is understood to be a statistical statement describing relationships among variables (Smith, 2004). The measurement model consists of defining the relationship between latent variables and observed variables (Ullman & Bentler, 2012). The main purpose of specifying the measurement model is to observe if the latent constructs in the model relate well to the proposed observed variables (Schumacker & Lomax, 2010). Once the work is concluded on the measurement model (i.e. the latent constructs are well measured), then the specification of the structural model takes place. It is in this model that the relationship among the latent constructs and observed variables (only those that are not indicators of latent variables) are investigated (Ullman & Bentler, 2012).

### **3.7.1 Structural Equation Modelling Steps**

Mueller and Hancock (2006) conceptualised SEM as a four step approach consisting of the following stages: (1) model conceptualisation, (2) parameter identification and estimation, (3) model fit and assessment, and (4) model modification.

#### ***3.7.1.1 Model Conceptualisation***

In the first stage, a full theoretical understanding and the development of a hypothesized model takes place. During this stage, all important and relevant information available to the researcher is used to develop a theoretical model (Schumacker & Lomax, 2010).

### ***3.7.1.2 Parameter Identification and Estimation***

The hypothesized model from the previous stage must be identified in the second stage. It is important to note however, that while Mueller and Hancock recommend performing parameter identification and parameter estimation in the same stage, other approaches advocate doing this in separate stages. As noted by Schumacker and Lomax (2010) it is essential to identify a workable model before embarking on the task of parameter estimation. Identification of a hypothesized model is accomplished when all the existing parameters can be expressed as functions of the variances and co-variances in the model (Mueller & Hancock, 2006). Related to model specification, all parameters must be designated as either free (unknown parameter that needs to be estimated), fixed (parameter fixed to a specific value usually 1 or 0) or constrained (unknown but held at the same value as other parameters in the model). There are three levels of model identification. First, an under-identified/not identified model is a model in which there is not enough information to distinctively determine all existing parameters. Second, a just-identified model is one in which there is just enough information to specifically determine all the existing parameters in the model. And third, an over-identified model is one in which there is not only enough information to estimate all the parameters in the model, but there is extra information to estimate the parameters in more than one way (Schumacker & Lomax, 2010). While useful for information purposes, under-identified models/not identified models are dead ends to the SEM researcher. And while both just-identified and over-identified models are models of interest, the SEM researcher is usually interested in the possibilities offered by over-identified models only (Mueller & Hancock, 2006). Continuing with Mueller and Hancock's approach, it is during the second stage that the structural and non-structural parameters of the model are estimated using one of many parameter estimation techniques available (e.g. Maximum Likelihood, Generalized Least Squares, etc).

### **3.7.1.3 Model Fit and Assessment**

The identified model is then assessed in the third stage of the process. The most important decision the researcher has to make at this stage is to choose how to assess the fit between the model and the data collected (Mueller & Hancock, 2006). Unlike many statistical procedures that are associated with one particular or a main fit index (e.g. Anova association with the  $F$ -test), in SEM there are several indices that can be used to assess model fit (Schumacker & Lomax, 2010). These indices can be divided into three categories: absolute indices (e.g. the Standardized Root Mean Square Residual [SRMR], the Chi-Square Test, etc) parsimonious indices (e.g. the Root Mean Square Error of Approximation, the Akaike Information Criterion [AIC], etc) and incremental (e.g. the Comparative Fit Index [CFI], the Normed Fit Index [NFI], etc). Absolute indices compare implied against observed covariance matrices and evaluate the overall differences between them. When using any of these indices, better model fit will be achieved if the number of parameters is increased and the number of degrees of freedom decreased. In the case of parsimonious indices, these indices also compare and evaluate implied and observed covariance matrices and evaluate the overall differences between them. In addition, as in the case of absolute indices, model fit is improved by adding new parameters. However, in the case of parsimonious indices, the complexity of the models becomes essential as model fit is improved only when the parameters added contribute positively to the model. As for incremental indices, these indices assess absolute or parsimonious fit in relation to the baseline model. It is not out of the norm (if the model allows it) to choose indices from all three categories when performing fit assessment (Mueller & Hancock, 2006). To avoid the perception of bias towards a favourable index, it is advisable that researchers use multiple indices when performing SEM assessment (Shook, Ketchen, Hult, & Kacmar, 2004)

### **3.7.1.4 Model Modification**

In the last stage of Mueller and Hancock's approach, model modification takes place (if needed). Typically, if the chosen theoretical model does not fit the data, then modifications to this model are made before retesting the model again (Schumacker & Lomax, 2010). According to Mueller and Hancock (2006), theoretical models are

only approximations to what the “best” model should be; therefore, the task is to identify the level of misspecification of the hypothesized model. Model misspecification occurs when important variables are left out of the model and/or other less important are included. When this becomes an issue, the original model theory can be reviewed first, and if needed more relevant theory can be investigated in order to re-specify the model until an appropriate fit is found.

### **3.8 Mediation**

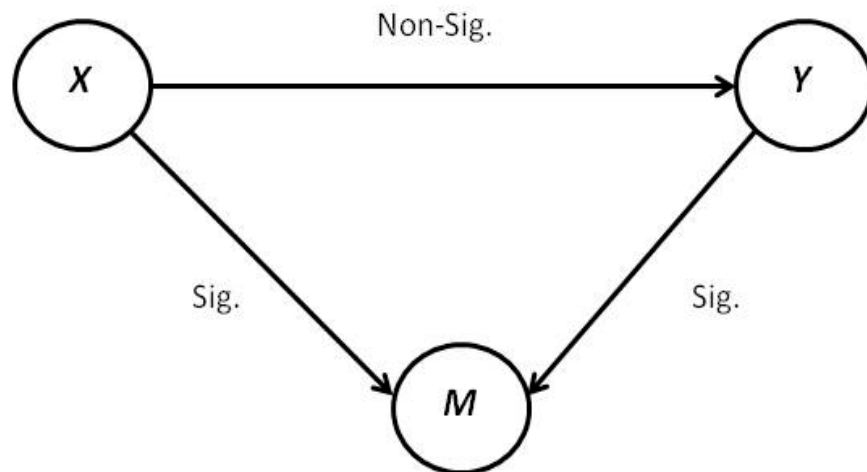
The possibility that observed relationships may be part of a more intricate system must always be considered. When this is considered, one way to assess complex models available is through mediation (Little, Card, Bovaird, Preacher, & Crandall, 2007). Mediation is a causal model that is evaluated by measuring how well the proposed model fits the data. Fit is generally understood as the ability of a model to reproduce data (i.e., usually the variance-covariance matrix). In the most basic sense, mediation is an attempt to understand the mechanism through which a dependent variable is affected by the independent variable; or in linear regression terms, the mechanism through which a criterion variable is affected by a predictor variable (Kenny, 2000; Kenny & McCoach, 2003).

#### **3.8.1 Mediation Process**

According to Baron and Kenny (1986), three basic conditions must be met in order for a relationship of mediation to exist. In the relationship between  $X$  (where  $X$  is the predictor variable) and  $Y$  (where  $Y$  is the criterion or outcome variable) mediated by  $M$  (where  $M$  is the proposed mediator) the following conditions must be met:

1.  $X$  must be significantly related to  $M$ .
2.  $M$  must be significantly related to  $Y$ .
3. The relationship between  $X$  and  $Y$  must diminish when  $M$  is included in the model.

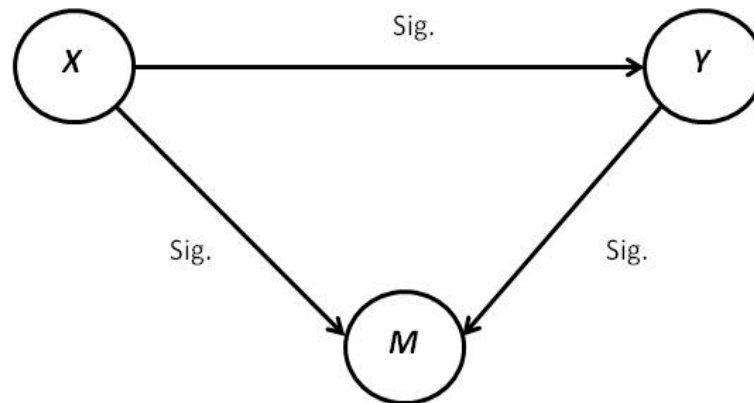
Mediation can be full, partial, or non-existent. For a full mediation to exist, the variance in the relationship between X and Y will be non-significant, and all the variance in this relationship should be accounted indirectly via M. That is, the association between X and Y will be accounted only through M by adding the paths between X and M and between Y and M, both of which should be significant (see Figure 5).



**Figure 5. Full mediation.** *X* = the predictor variable; *Y* = the criterion or outcome variable; *M* = the mediating variable.

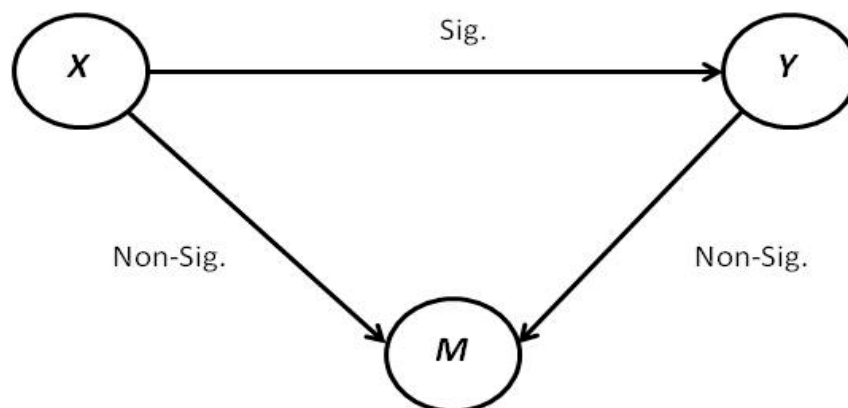


For a partial mediation to exist, the variance in the relationship between  $X$  and  $Y$  should be accounted by significant paths between  $X$  and  $Y$ , but also between  $X$  and  $M$  and  $Y$  and  $M$  (see Figure 6).



**Figure 6. Partial mediation.**  $X$  = the predictor variable;  $Y$  = the criterion or outcome variable;  $M$  = the mediating variable.

Regarding non-existent mediation, if the relationship between  $X$  and  $M$  or between  $Y$  and  $M$  or both are not significant, and all the variance is significantly accounted by the relationship between  $X$  and  $Y$ , then this would be an indication that no mediation exists (see Figure 7).



**Figure 7. No mediation.**  $X$  = the predictor variable;  $Y$  = the criterion or outcome variable;  $M$  = the mediating variable.

It is important to note that the different types of mediation terms above mentioned are used informally and only as a way to describe effect sizes. In statistical language, the correct terms that should be used are either partial mediation or complete mediation which are based on p-values and sample size in addition to effect sizes. Nevertheless, the use of partial and complete mediation carries other implications and may lead to issues of inflated effect sizes because of the use of p-values to calculate these effects. In consequence, the use of informal descriptions of mediation is a common practice among researchers when reporting results (Little et al., 2007). Two other important issues regarding mediation are: First, if the hypothesized mediational model is not correctly specified, then the results are of little to no use and can even be misleading (Kenny & McCoach, 2003). And second, since the probability of a regression coefficient having a value of zero is almost impossible, then the likelihood of full mediation to exist is practically null (Little et al., 2007).

### **3.8.2 Baron and Kenny Method**

Regarding the Baron and Kenny approach to mediation which has been mentioned before in the current and prior chapters, even though this is the most often used method for testing mediation, two major issues with this approach are often discussed in the literature. First, the need to demonstrate statistical significance in the relationship between X and Y in order to be able to continue to test for mediation; and second, the condition that, once M is included, the relationship between X and Y must become non-significant in order for the mediation effect to exist. These two issues are considered important flaws of the Baron and Kenny approach (Krause et al., 2010).

Regarding the first flaw, according to Shrout and Bolger (2002), mediation can still be found even in the absence of a significant statistical effect in the relationship between X and Y in spite of Baron and Kenny's assertions. This may occur through either suppression or dilution. Suppression occurs when two opposing mediators exist (mediators with opposite signs) in the same relationship between X and Y. The result of such situation would lead to both mediators mutually cancelling out their mediation effect on the X-Y relationship. Dilution occurs when the relationship

between X and Y is not significant due to Y being very distal from X before M is introduced. However, once M is introduced, Y becomes proximal to X, and as a result, a significant relationship between X and Y is observed. Dilution however may be closer related to moderation than mediation. Moderation occurs when a third variable modifies the causal effect in the relationship between X and Y (Wu & Zumbo, 2008). As for the second flaw associated with the Baron and Kenny approach, the possibility of full mediation (when the variance in the relationship between X and Y are non-significant and all the variance in this relationship is accounted indirectly via M) is basically, as before noted, a statistical impossibility (Little, Card, Bovaird, Preacher, & Crandall, 2007).

### **3.9 Model Estimation**

Four general models and several sub-models were created. All the models and sub-models built for this study were estimated using the Weighted Least Squares Means and Variance (WLSMV) estimation method in MPlus as it is the recommended estimation method when a model contains categorical observed outcomes (Muthen & Muthen, 1998-2012) as was the case for all models in this study. Several indices were used to evaluate the goodness of fit of the models as suggested by Quintana and Maxwell (1999) including Chi-square, Root-Mean Square Error of Approximation (RMSEA), the Comparative Fit Index (CFI), and the Tucker Lewis Index (TLI). According to Hu and Bentler (in Quintana & Maxwell, 1999) the RMSEA is likely the ‘most straight forward and intuitive approach to understanding the fit of a model’. Hu and Bentler (1999) recommended a cut-off value for RMSEA of .06 or less, and a value of .95 or above for the CFI and the TLI. These cut-off values are in agreement with most statistical authorities today (Hooper, Coughlan, & Mullen, 2008).

All model comparisons were performed using the chi-square difference test ‘difftest’ command in Mplus which is designed to test for differences in model fit when using the WLSMV estimator. The first step when performing a ‘difftest’ is to run a calculation of the least constrained model (a model with the most free parameters which is also identified as the hypothesis or H1), and the result of the calculation is

then saved in a specific file for further use in all the operations that follow. After that, a model (a nested model with fewer free parameters which is also identified as the null hypothesis or H0) is run for comparison with the least constrained model. In the output that follows, if the result is significant ( $p < .05$ ), then H0 is rejected, but if the result is not significant then H0 must be accepted. Rejecting H0 indicate the least constrained model should be kept, while accepting H0 indicates that the more constrained model must be kept.

### **3.10 Sample Size and statistical Power**

As noted by Quintana and Maxwell (1999), large sample sizes are needed when performing SEM as it is the only way to have enough statistical power which is a prerequisite to obtaining meaningful results and an acceptable level of precision for parameter estimates. The problem however is that there is no consensus on what a large or a small sample size should be, or how to deal with the issue of determining a sample size for adequate statistical power (Anderson & Gerbing, 1988).

According to Quintana and Maxwell (1999), general guidelines for determination of sample size must be based on three basic principles: (1) the needs for performance of statistical indices must be met by the number of participants; (2) the number of participants must be appropriate for the number of parameters being investigated; and (3) the number of participants must be appropriate for the number of degrees of freedom. Even though some statistical indices may perform well with as few as 100 participants, most indices perform best when the sample size is over 200 participants. In the case of complex models (i.e. models with large number of manifest and latent variables and large number of degrees of freedom as the models in the present study) it is accepted that the minimum number of participants should be between 300 and 1000. In this approach, the more complex the model, the larger the number of participants needed to achieve adequate power (Bentler & Chou, 1987). An issue with Bentler and Chou's recommendations is that they are not based on mathematical theory; instead, they are largely based on personal experience (Quintana & Maxwell, 1999). A different approach with mathematical and statistical theory foundations comes from MacCallum, Browne, and Sugawara (1996) who (reluctantly) suggested

guidelines for power calculation and appropriate sample size based on the goodness of fit index RMSEA. According to these guidelines (which are provided as tables), complex models require small sample sizes when compared to the requirements of less complex models. For example, a complex model (e.g.  $df = 90$ ) would require a minimum sample size of 175 to achieve a power of .80 (RMSEA), and a minimum of 108 participants for a power of .50 (RMSEA); while a less complex model (e.g.  $df = 10$ ) would require a minimum sample size of 651 to achieve a power of .80 (RMSEA), and a minimum of 369 participants for a power of .50 (RMSEA). Hence, contrary to the approach suggested by Bentler and Chou, in MacCallum and colleagues' approach, the more complex the model, the smaller the sample size needed in order to achieve adequate power. Even though it should be preferable to follow methods that are based on mathematical or statistical theories, in this case, Quintana and Maxwell (1999) still recommend using sample sizes of 200 or more when performing SEM procedures. Furthermore, they suggest, whenever possible, using both approaches to calculate the sample size and always choosing the larger of the two. Regarding the present study, taking into consideration both approaches and using a cut-off value for RMSEA of .06, the current sample size of 574 participants appears to be appropriate in meeting the requirements for achieving adequate power.

### **3.11 Model Analysis**

According to Anderson and Gerbing (1988), even though the ability to estimate multiple models simultaneously using modern statistical programs is possible (e.g. AMOS, LISREL, MPLUS, etc) it is not recommended to do so as issues with model misspecification and construct validity may be overlooked. This issue has also been noted by other researchers including Wu and Zumbo (2008), who also found model misspecification to be an issue of concern when using SEM to look for the statistical model that best fits for the data. This is because there will always be "other" alternative models that will be a good fit to the data in addition to the selected model. According to Anderson and Gerbing, one way to lessen the risk of model misspecification is to estimate (and re-estimate as needed) the measurement models first until an acceptable model is found, and proceed with the evaluation of the structural model after that.

In this study, in line with Anderson and Gerbing's recommendations, the analysis of all the proposed models and sub-models first followed the three-step approach to testing mediated effects suggested by Holmbeck (1997), and the two-step modelling approach suggested by Anderson and Gerbing (1988, 1992) after that. The reasoning behind starting the process with Holmbeck's approach was to corroborate that a relationship between the predictor and the criterion actually existed since, as noted by Holmbeck, the existence of any further relationship is dependent upon a significant association between these two variables. It is also important to note that, according to Holmbeck, in order for mediation to exist all unconstrained paths assessed in any of the three steps must be significant. In the present study, rather than using crowded general models to investigate the proposed relationships, a series of simplified sub-models were used in order to minimize the risk of misspecification as much as possible (please see section 3.12 and section 3.13 for in-depth explanations).

### **3.12 Structural Models**

Four general a priori models were specified based on theoretical assumptions and conclusions drawn from the general review of the literature (section 1), and the systematic review (section 2). Using these hypothetical models as a foundation, several measurement and structural models as well as several sub-models were created in order to examine and test the proposed hypotheses. The reason for creating models and sub-models instead of estimating all the proposed relationships simultaneously (which is possible in Mplus) is because this approach is usually not recommended. Model misspecification and issues with construct validity can be easily overlooked when the estimation of multiple models is performed simultaneously (Anderson & Gerbing, 1988). In this study, this could have happened if all three types of childhood maltreatment (emotional, sexual, and physical), and/or the two different types of emotion regulation (suppression and reappraisal), and/or parental bonding (indifference and overprotection) had been estimated simultaneously. However, when two proposed mediators are conceptually different and not highly correlated (e.g. emotion regulation suppression and metacognition), it would be advantageous to test the mediators simultaneously as this process could

indicate if a specific mediator is independent of the effects of other mediators (Kenny, 2013). Therefore, taking into consideration the recommendations of SEM experts, it was decided to include two distinct and conceptually different mediators in each of the sub-models tested. The combination of mediators was either metacognition and emotion regulation suppression, or metacognition and the lack of emotion regulation reappraisal.

The building of all four structural equation models was the same in all cases. First, in order to avoid complex misspecification, the simplest foundation of the overall model, the measurement model, was specified. Thus, a CFA with saturated covariances among factors was performed (see Figure 13, Figure 16, Figure 25, and Figure 33 in the results section). According to Curran and Bauer (2010), this is a good strategy to avoid measurement misspecification being confounded by structural misfit and it also improves the chances of obtaining the best possible measurement. After that, a revised (re-specified) model was built by allowing the residuals of indicators belonging to the same measures to correlate (see Figure 14, Figure 17, Figure 26, and Figure 34 in the results section). It is important to note that even though the results of all measurement models suggested a good or at least an acceptable fit to the data, all models were still re-specified in order to look for improvement. This approach made sense since two of the latent variables used in the study (metacognition and BPD traits), had multiple indicators that were all part of the same measure (metacognition) or had several indicators that were sub-scales belonging to more than one measure, as was the case for the BPD traits construct. In consequence, a degree of local dependence was expected. Specifically, in the case of the BPDT composite that had eight indicators (sub-scales) from three different measures, the residuals of the two indicators from the HADS (anxiety and depression), the residuals of all four indicators belonging to the IIP-SC (the overly accommodating, the vindictive, the self-sacrificing, and the intrusive sub-scales), and the residuals of the two indicators from the BIS-11 (attentional impulsivity and motor impulsivity sub-scales) were all allowed to correlate between each other as long as the indicators belonged to the same measure. In the case of the latent variable metacognition, the residuals of the three indicators used to define the

variable (the cognitive confidence, the positive beliefs about worry, and the need to control thoughts sub-scales) were also allowed to correlate with each other. Finally, structural models were created by incorporating specific structural parameters into each model (see Figure 15, Figure 18, Figure 27, and Figure 35 in the results section).

### **3.13 Sub-Models**

The process for all sub-models started as follow: First, a direct-effect model was created in which the direct effect of the predictor on the criterion in the absence of mediators was measured. If the relationship was found to be significant, the process continued to the second step. If the relationship was not found to be significant, then the results were noted and the work was concluded on that particular sub-model. In the second step, a partially mediated structural sub-model in which the direct effect from the predictor to the criterion and the unconstrained path(s) from the predictor to the criterion through the mediator(s) were all measured. The last step in the process was to create a fully mediated sub-model in which the unconstrained path(s) from the predictor to the criterion through the mediator(s) were all measured, but the direct effect from the predictor to the criterion was constrained (held at zero). After that, the partially mediated sub-model was compared with the fully mediated sub-model to search for the sub-model that better fit the data, and from that process, the final sub-model was chosen.

In the first step, utilising the Anderson and Gerbing's approach, Confirmatory Factor Analysis was used to test the measuring sub-model in order to find out if the sub-model was a good fit to the data, and to assess the degree to which each latent construct was represented by its indicators. In this step, all latent constructs were allowed to freely correlate with one another. After that, if the measuring sub-model was acceptable, the process moved to the second step in which testing of the structural sub-model took place. According to Anderson and Gerbing's recommendations, it is important to assess at least four alternative structural sub-models in order to improve the probability of finding a better fitting sub-model. Furthermore, all alternative sub-models must be nested in the saturated sub-model



(Ms), and while some freedom exists in choosing the structure of the alternative nested sub-models, they must adhere to the hypothesized sub-model. Anderson and Gerbing suggested the use of the following sequence for alternative sub-models:  $M_n < M_c < M_t < M_u < M_s$  where (Mu) is the most likely unconstrained alternative, (Mt) is the theoretical model of interest, (Mc) is the next most likely constrained alternative, and (Mn) is the null structural sub-model.

It is important to note that since three of the sub-models (the measurement, the partially mediated, and the fully mediated) were first assessed using Holmeck's approach in all applicable sub-models; only two more alternative sub-models were tested using Anderson and Gerbing's method. Also, because of model differences (the use of one predictor variable for Models I and II and all the corresponding sub-models, versus the use of two predictor variables for Models III and IV and the corresponding sub-models) the procedure of selecting alternatives for all sub-models corresponding to Models I and II was somewhat different to that of Models III and IV. Essentially, the alternative sub-models corresponding to Models I and II strictly adhered to the approach suggested by Anderson and Gerbing, while the alternative sub-models corresponding to Models III and IV had to be adjusted significantly in order to better meet their specific needs and challenges. Hence, saturated, partially mediated, and fully mediated alternative sub-models were tested in all models, but the remaining alternative sub-models in Models III and IV differed as (Mn-the null sub-model) and (Mc-the direct sub-model) were not used. Instead Models III and IV were tested as follow: first, an alternative model was assessed in which predictor X was partially mediated and predictor Y was fully mediated; and second, another alternative model in which predictor X was fully mediated and predictor Y was partially mediated. Both alternative sub-models used were still nested in the saturated sub-model nevertheless and were compared with the other alternative sub-models as suggested by Anderson and Gerbing. To highlight these differences and also to avoid confusion, capital letters were used to identify the alternative models belonging to Model III and Model IV (i.e. A, B, C, and D).

### **3.14 Hypotheses**

Several conclusions can be drawn from the general review of the literature presented in the introduction, and also the systematic review presented in chapter 2. First, there is no single cause or risk factor that can be singled out as responsible for the development of BPD related features. Second, while there is a genetic component to the disorder, environmental factors appear to be equally important. In other words, environmental and biological factors appear to play an equally important role in the development of BPD traits. Attachment related difficulties in childhood along with childhood maltreatment are two of the most often mentioned environmental contributors to the aetiology of BPD, as well as indicators of less positive outcomes. Metacognition and emotion regulation (among other factors) appear to play an important role in the maintenance and exacerbation of borderline personality features, however, the specific role they play in the disorder is still not fully understood. And last, there is evidence to suggest that the functions of metacognition and emotion regulation could be better understood when they are viewed as mediators rather than features of BPD. And while the evidence appears to be stronger for emotion regulation than for metacognition, extensive research is needed before more conclusive statements can be made.

In line with these conclusions, the purpose of the present study is to use structural equation modelling (SEM) to examine the potential interactions and mediating effects of metacognition and two different types of emotion regulation (emotion regulation suppression and the lack of emotion regulation reappraisal) on the relationship between different types of childhood maltreatment (sexual, emotional, and physical abuse) and a composite of features associated with BPD. The same process will also be used to examine the potential interactions and mediating effects of mentalization and the different types of emotion regulation above mentioned on the relationship between adult attachment, maternal parental bonding, and the composite of core BPD features.

The first inference of this study is that there will be direct relationships between each of the three types of childhood maltreatment and the composite of BPD traits. There

will also be indirect relationships between all three forms of childhood maltreatment and the composite of BPD traits which will be mediated by metacognition, emotion regulation suppression, and the lack of emotion regulation reappraisal. It is expected that all three mediators will have a unique effect independent of one another in the above stated relationships. The second inference is that, a direct relationship between a general form of adult insecure attachment and the composite of BPD traits is expected to be found. In addition, indirect relationships mediated by metacognition, emotion regulation suppression, and the lack of emotion regulation reappraisal are also expected. As in the relationship between childhood abuse and the composite of BPD features, it is expected that all three mediators will have a unique effect in this relationship independent of one another. And finally, even though no supporting evidence was found in the literature for the association between maternal parental bonding and BPD features, this relationship will be investigated as maternal bonding is an integral part of attachment.

It is important to mention that the reason for separating maternal bonding from the construct of adult insecure attachment was because of the different conceptualization and theoretical foundation of the psychometric measures used to assess them. The measure used for adult attachment (the Relationship Scale Questionnaire; see section 3.4.4) is supposed to be used as a continuous measure of adult attachment, whereas the measure used to assess maternal bonding (the Parental Bonding Instrument; see section 3.4.5) is an assessment of an individual's view of parental bonding during the first 16 years of life only.

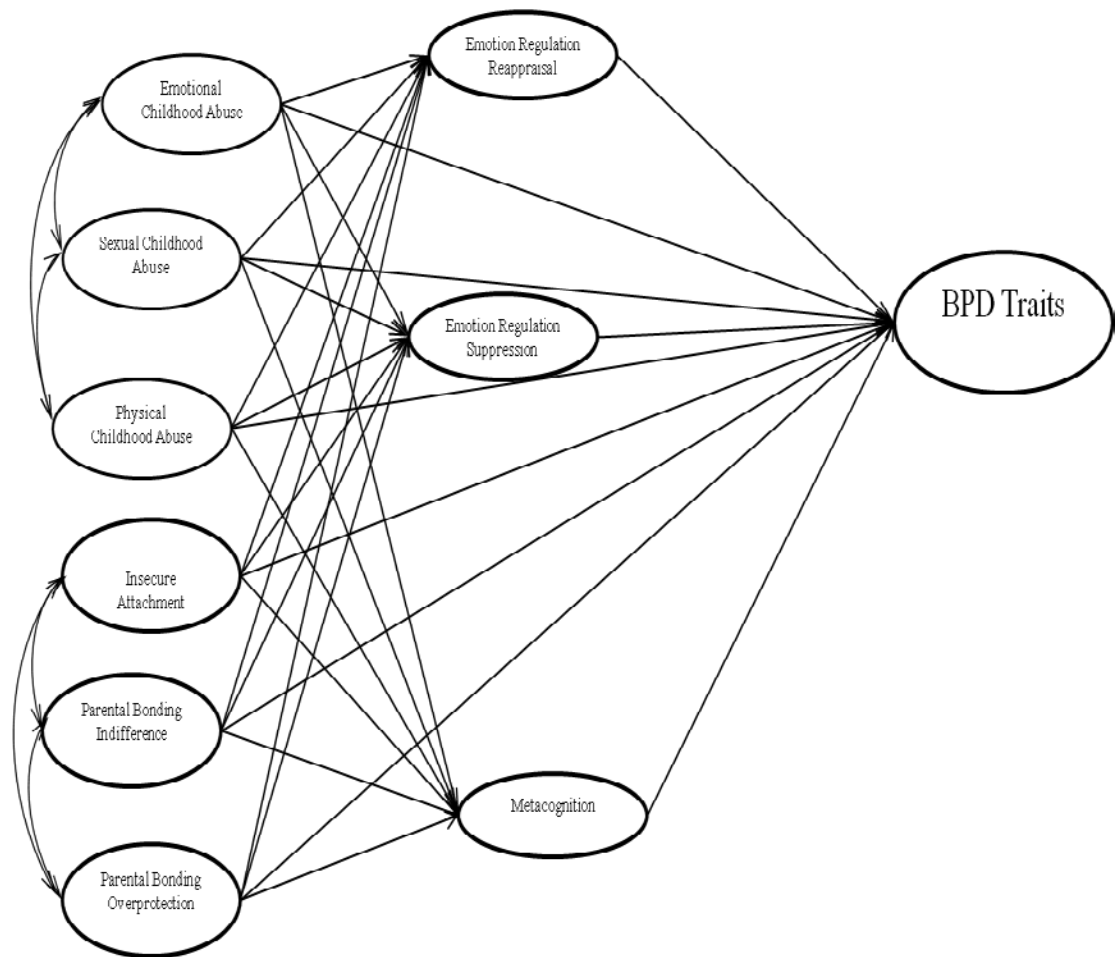
In addition to investigate the direct relationship between maternal bonding and BPD traits, the indirect relationships mediated by metacognition, emotion regulation suppression, and the lack of emotion regulation reappraisal will also be examined following the same process. It will not be expected for the indirect relationships mediated by metacognition, emotion regulation suppression, and the lack of emotion regulation reappraisal to render the direct relationships between the predictor variables (emotional, sexual, and physical maltreatment, adult attachment, and maternal parental bonding) and the composite of core BPD traits insignificant (i.e. a

full mediation effect) since as noted by Little, Card, Bovaird, Preacher, and Crandall (2007) “...full mediation can never logically exist in the population because it requires a regression weight to be exactly equal to zero. Hence the probability of this occurring in practice is zero.” However, it is expected that all the mediators will account for a significant amount of the variance observed in the proposed indirect relationships.

Also, this study will attempt to answer the following questions:

- Does emotion regulation (emotion suppression and/or the lack of emotion regulation reappraisal) mediate the relationship between childhood maltreatment (sexual and/or emotional and/or sexual abuse) and the composite of BPD features constructed for this study?
- Does metacognition mediate the relationship between childhood maltreatment (sexual and/or emotional and/or sexual abuse) and the composite of BPD features?
- Does emotion regulation (emotion suppression and/or the lack of emotion regulation reappraisal) mediate the relationship between attachment and the composite of BPD features?
- Does metacognition mediate the relationship between attachment and the composite of BPD features?
- Does emotion regulation (emotion suppression and/or the lack of emotion regulation reappraisal) mediate the relationship between maternal parental bonding and the composite of BPD features?
- Does metacognition mediate the relationship between maternal parental bonding and the composite of BPD features?

Please note that for the purpose of this study, all the proposed hypotheses are considered to be part of the same model. However, also note that all individual questions put forward in the study (Questions 1 through 24 below) were necessary in order to analyse different angles and pathways within the general model. See Figure 8 for a full schematic representation of all the proposed hypotheses in the study.

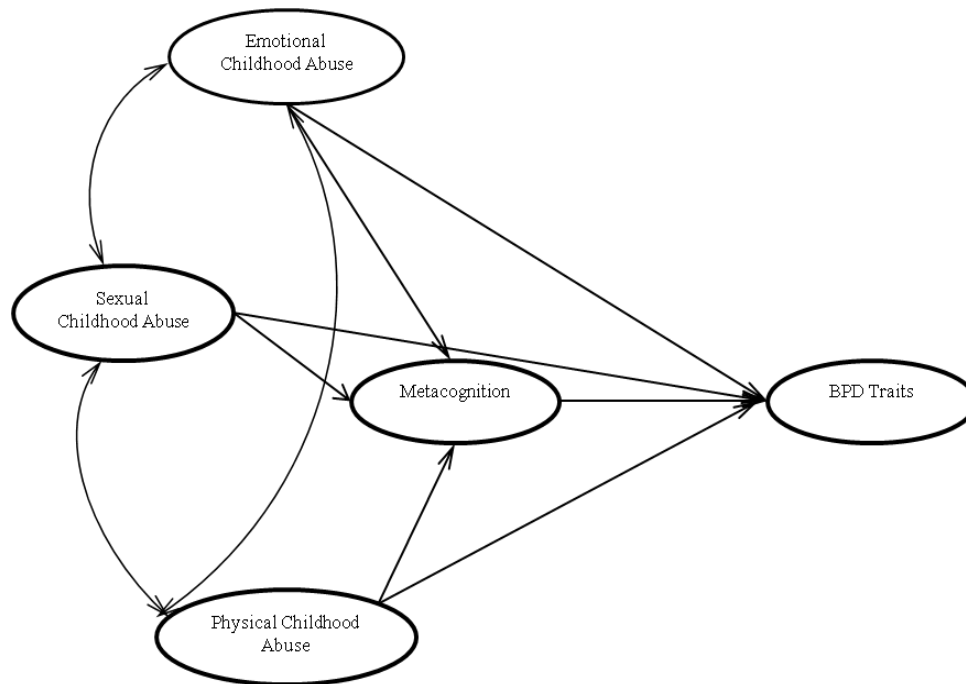


**Figure 8. Full schematic representation of all the proposed hypotheses in this study.**

The specific hypotheses relating to the use of metacognition as mediator in the relationship between childhood maltreatment (emotional, sexual, or physical childhood abuse) and the composite of BPD traits were postulated as follow:

- 1) There will be a direct relationship between emotional childhood maltreatment and features associated with BPD.
- 2) The relationship between emotional childhood maltreatment and BPD traits will be mediated by metacognition.
- 3) There will be a direct relationship between sexual childhood maltreatment and features associated with BPD.
- 4) The relationship between sexual childhood maltreatment and BPD traits will be mediated by metacognition.
- 5) There will be a direct relationship between physical childhood maltreatment and features associated with BPD.

- 6) The relationship between physical childhood maltreatment and BPD traits will be mediated by metacognition (see Figure 9 for a schematic representation of all the above proposed hypotheses).

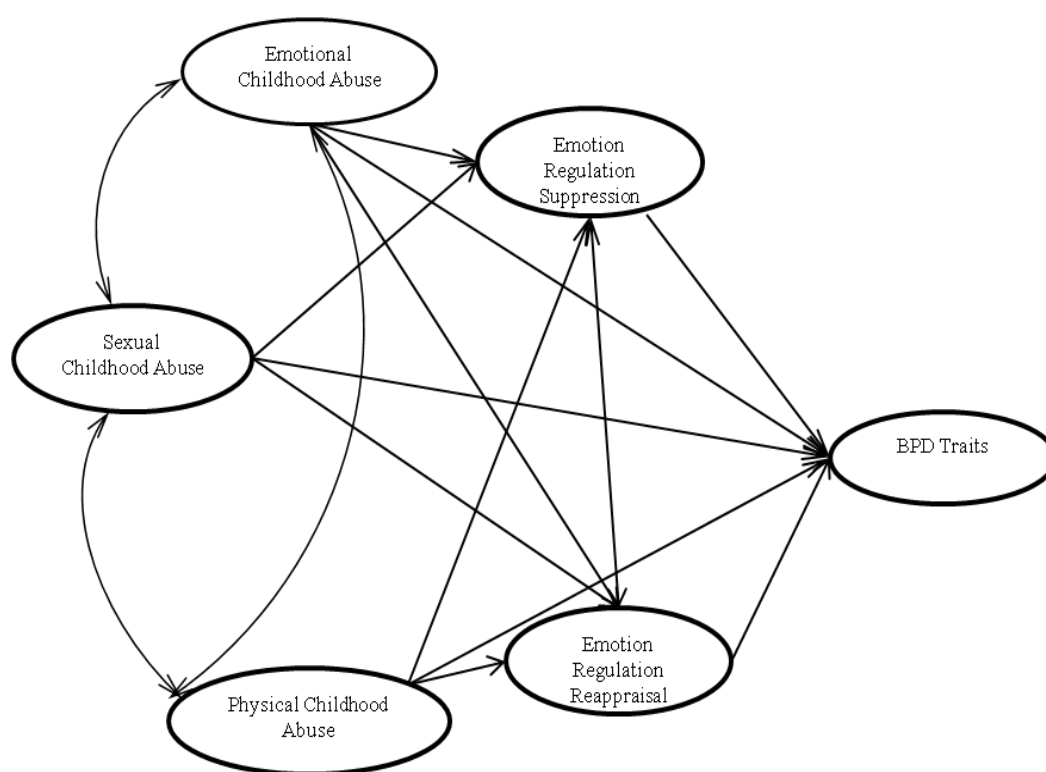


**Figure 9. A priori Hypothesis Model: Metacognition as a mediator in the relationship between specific type of childhood maltreatment and BPD traits. All the represented pathways in the model are based on the theoretical assumptions drawn from the general and the systematic reviews.**

Specific hypotheses relating to emotion regulation (either suppression or reappraisal) acting as mediators in the relationship between childhood maltreatment (emotional, sexual, or physical) and the composite of BPD features:

- 7) The relationship between emotional childhood maltreatment and the composite of BPD features will be mediated by emotion regulation suppression.
- 8) The relationship between emotional childhood maltreatment and the composite of BPD features will be mediated by the lack of emotional reappraisal.
- 9) The relationship between sexual childhood maltreatment and the composite of BPD features will be mediated by emotion regulation suppression.

- 10) The relationship between sexual childhood maltreatment and the composite of BPD features will be mediated by the lack of emotional reappraisal.
- 11) The relationship between physical childhood maltreatment and the composite of BPD features will be mediated by emotion regulation suppression.
- 12) The relationship between physical childhood maltreatment and the composite of BPD features will be mediated by the lack of emotional reappraisal (see Figure 10 for a schematic representation of all the above proposed hypotheses).



**Figure 10. A priori Hypothesis Model: Specific type of emotion regulation as a mediator in the relationship between specific type of childhood maltreatment and BPD traits. All the represented pathways in the model are based on the theoretical assumptions drawn from the general and the systematic reviews.**

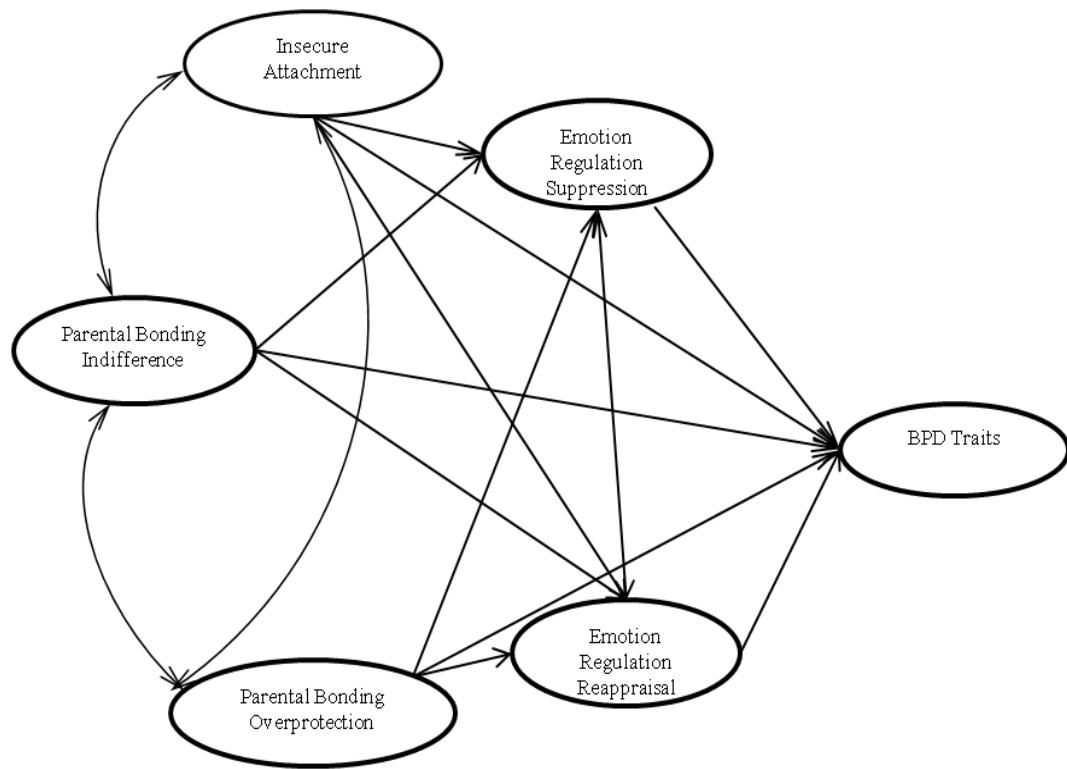
Specific hypotheses relating to emotion regulation (either suppression or reappraisal) acting as mediators in the relationship between parental bonding (either parental bonding indifference or parental bonding overprotection) and the composite of BPD features:

- 13) There will be a direct relationship between parental bonding indifference and the composite of BPD features.
- 14) There will be a direct relationship between parental bonding overprotection and the composite of BPD features.
- 15) There will be a direct relationship between insecure attachment and the composite of BPD features.
- 16) The relationship between parental bonding indifference and the composite of BPD features will be mediated by emotion regulation suppression.
- 17) The relationship between parental bonding indifference and the composite of BPD features will be mediated by the lack of emotion regulation reappraisal.
- 18) The relationship between parental bonding overprotection and the composite of BPD features will be mediated by emotion regulation suppression.
- 19) The relationship between parental bonding overprotection and the composite of BPD features will be mediated by the lack of emotion regulation reappraisal (see Figure 11 for a schematic representation of all the above proposed hypotheses).

Specific hypotheses relating to emotion regulation (either suppression or reappraisal) acting as mediators in the relationship between insecure attachment and the composite of BPD features:

- 20) The relationship between insecure attachment and the composite of BPD features will be mediated by emotion regulation suppression.
- 21) The relationship insecure attachment and the composite of BPD features will be mediated by the lack of emotion regulation suppression (see Figure 11 for a schematic representation of all the above proposed hypotheses).

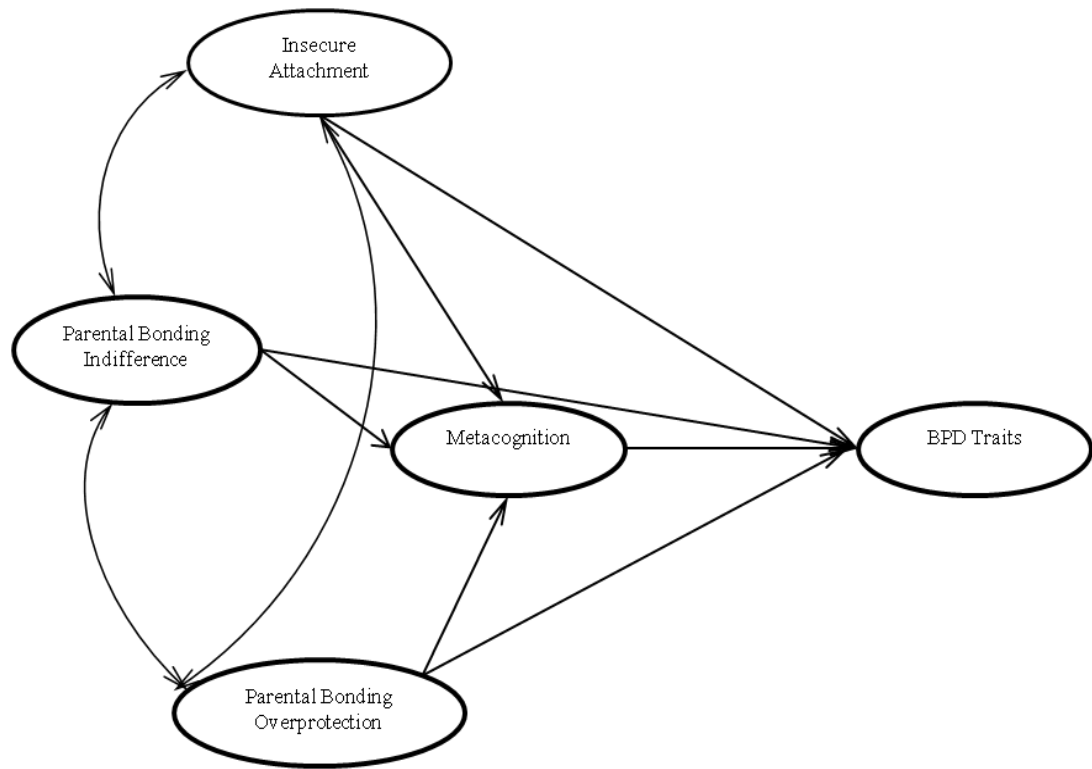




**Figure 11. A priori Hypothesis Model: Specific type of emotion regulation as a mediator in the relationship between specific type of parental bonding and BPD traits. Also, specific type of emotion regulation as a mediator in the relationship between insecure attachment and BPD traits. All the represented pathways in the model are based on the theoretical assumptions drawn from the general and the systematic reviews.**

Specific hypotheses relating to metacognition acting as mediators in the relationship between parental bonding (either parental bonding indifference or parental bonding overprotection) and the composite of BPD features:

- 22) The relationship between parental bonding indifference and the composite of BPD features will be mediated by metacognition.
- 23) The relationship between parental bonding overprotection and the composite of BPD features will be mediated by metacognition.
- 24) The relationship between insecure attachment and the composite of BPD features will be mediated by metacognition (see Figure 12 for a schematic representation of all the above proposed hypotheses).



**Figure 12. A priori Hypothesis Model: Metacognition as a mediator in the relationship between specific type of parental bonding and BPD traits. Also, metacognition as a mediator in the relationship between insecure attachment and BPD traits. All the represented pathways in the model are based on the theoretical assumptions drawn from the general and the systematic reviews.**

## 4 RESULTS

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The results section is structured as follow: First, a comparison between participants who completed the survey and participants who did not. Second, the schematic representations and basic information regarding Model I and Model II are presented followed by the process involved in the building and assessment of the corresponding sub-models (1 through 6) including statistical analyses, comparison of alternative models, and schematic representations. Next, the schematic representation and basic information regarding Model III is presented followed by the work involved in the construction and evaluation of the corresponding sub-models (sub-models 7, 8, 9, and 10). And last, the schematic representation and basic information regarding Model IV is presented followed by the work involved in the building and assessment of the corresponding sub-models (sub-models 11 and 12).

### 4.1 Participant Comparison

The sample used in this study was comprised of 574 participants. Please see Table 19 and Table 20 below for demographic information. Also, see Table 21 and Table 22 for descriptive data of each of the measures and subscales used in the study.

**Table 19.** *Demographic information of participants (gender)*

	Frequency	Percent	Valid Percent	Cumulative Percent
Male	149	26.0	26.0	26.0
Valid Female	425	74.0	74.0	100.0
Total	574	100.0	100.0	

**Table 20.** *Demographic information of participants (race/ethnicity)*

	Frequency	Percent	Valid Percent	Cumulative Percent
Caucasian	485	84.5	85.1	85.1
Asian	34	5.9	6.0	91.1
Valid Mixed	19	3.3	3.3	94.4
Other	32	5.6	5.6	100.0
Total	570	99.3	100.0	
Missing -99	4	.7		
Total	574	100.0		

In order to explore the impact of age, ethnicity and gender on the participants who accessed the survey (including those who did not complete it), several one-way between groups analysis of variance (ANOVA) tests were conducted. All participants who provided sufficient identification information were included in these analyses. In consequence, a total of 33 participants were removed since, even though they were recorded as participants by the BOS system, they did not provide any information beyond the consent page. Namely, no actual demographic data or otherwise was entered or recorded for these participants. The remaining 662 participants were assigned to three groups according to their level of participation and identified by the number of participants within each group for practical purposes (Group 88, Group 59, and Group 515). Participants were assigned to Group 88 if they accessed the survey but failed to progress beyond the first half of the first scale. In other words, participants were assigned to this group if they answered less than five of the 205 measure-relevant questions. If participants accessed and completed the survey, but missed at least one of the questions in the survey, they were assigned to Group 59. The remaining participants were all assigned to Group 515 as they completed the survey without missing any of the questions.

**Table 21.** *Descriptive data for measures by scale*

Scale	Mean	Range	Variance	Std. Deviation	N of Items	Cases		
						Valid	Excluded	Total
CTQ Emotional Maltreatment	8.44	0.79	15.803	3.975	5	528	46	574
CTQ Physical Maltreatment	6.01	0.27	5.770	2.402	5	528	46	574
CTQ Sexual Maltreatment	14.09	0.09	5.551	2.359	5	528	46	574
ERQ Suppression	14.09	1.99	27.339	5.229	4	574	0	574
ERQ Reappraisal	29.49	0.31	41.294	6.426	6	574	0	574
MCQ All Factors	58.64	1.23	198.224	14.079	29	554	20	574
MCQ Cognitive Self Consciousness	15.45	0.85	19.944	4.466	6	554	20	574
RSQ Insecure Attachment	35.13	1.40	120.660	10.985	13	517	57	574
PBI Mother	66.77	1.81	87.231	9.340	25	515	59	574
PBI Mother Indifferent	10.11	0.66	16.636	4.079	6	518	56	574
PBI Mother Overprotective	21.58	0.49	22.129	4.704	7	516	58	574

**Table 22.** *Descriptive data for measures by scale*

Scale	Mean	Range	Variance	Std. Deviation	N of Items	Cases		
						Valid	Excluded	Total
IIP-SC Overly Accommodating	11.25	0.85	13.530	3.678	4	518	56	574
IIP-SC Self-Sacrificing	10.31	0.61	13.938	3.733	4	518	56	574
IIP-SC Intrusive/Needy	8.00	0.23	11.284	3.359	4	518	56	574
IIP-SC All 3 Scales Together	29.56	1.26	69.465	8.335	12	518	56	574
BIS Attentional Impulsiveness	16.56	0.54	15.580	3.947	8	515	59	574
BIS Motor Impulsiveness	11.74	0.38	8.268	2.875	6	515	59	574
HADS Anxiety	15.33	0.50	16.830	4.102	7	574	0	574
HADS Depression	10.92	0.74	10.492	3.239	7	574	0	574
BPD Composite	78.2	1.93	221.140	14.871	38	518	56	574

A one-way ANOVA was conducted to examine whether there were statistically significant differences in regards to age among the three different groups of participants. The results indicated there was not a statistically significant difference at the  $p < .05$  level for the three groups:  $F(2, 659) = .134, p = .875$  (see Table 23 and Table 24 below for full results).

**Table 23.** *Descriptive statistic comparisons based on age of participants*

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
59	59	26.12	8.373	1.090	23.94	28.30	18	51
88	88	25.89	8.294	.884	24.13	27.64	18	51
515	515	25.59	8.485	.374	24.86	26.33	17	64
Total	662	25.68	8.439	.328	25.03	26.32	17	64

**Table 24.** *ANOVA results based on age of participants*

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	19.065	2	9.532	.134	.875
Within Groups	47053.402	659	71.401		
Total	47072.467	661			

In regards to ethnicity, a one-way ANOVA was conducted to examine whether there were statistically significant differences in regards to ethnicity among the three different groups of participants who accessed the survey. The results indicated there was a statistically significant difference at the  $p < .05$  level for the three groups:  $F(2, 654) = 4.289, p = .014$  (see Table 25 and Table 26 below for full results). Post-hoc comparisons using the Fisher's Least Significant Difference (LSD) test indicated that the ethnicity of the participants who completed the survey without missing any

questions (Group 515 [ $M = 1.41$ ,  $SD = 1.06$ ]) was significantly different from the ethnicity of participants in the group of participants who accessed and completed the survey, but missed at least one of the measure-relevant questions in the survey (Group 59 [ $M = 1.78$ ,  $SD = 1.45$ ]), and from that of participants in the group who accessed the survey but failed to progress beyond the first half of the first scale (Group 88 [ $M = 1.68$ ,  $SD = 1.36$ ]; see Table 27 for full results). However, despite reaching statistical significance, the actual difference in mean scores between the groups was quite small. The effect size, calculated using eta squared ( $\eta^2$ ), was .01 indicating that ethnicity accounted for only 1% of the variance in between the groups. There were no statistically significant differences regarding ethnicity between participants in Group 59 and participants in Group 88 ( $p = .615$ ).

**Table 25.** *Descriptive statistic comparisons based on ethnicity of participants*

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
59	58	1.78	1.451	.191	1.39	2.16	1	5
88	87	1.68	1.360	.146	1.39	1.97	1	5
515	512	1.41	1.065	.047	1.31	1.50	1	5
Total	657	1.47	1.152	.045	1.39	1.56	1	5

**Table 26.** *ANOVA results based on ethnicity of participants*

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	11.261	2	5.630	4.289	.014
Within Groups	858.575	654	1.313		
Total	869.836	656			



**Table 27.** *Multiple comparisons (dependent variable ethnicity)***Least Significant Difference**

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
59	88	.098	.194	.615	-.28	.48
	515	.370*	.159	.020	.06	.68
88	59	-.098	.194	.615	-.48	.28
	515	.272*	.133	.041	.01	.53
515	59	-.370*	.159	.020	-.68	-.06
	88	-.272*	.133	.041	-.53	-.01

\* The mean difference is significant at the 0.05 level.

Regarding gender, a one-way ANOVA was conducted to examine whether there were statistically significant differences between males and females among the three different groups of participants who accessed the survey. The results indicated there was not a statistically significant difference at the  $p < .05$  level for the three groups:  $F(2, 659) = .783, p = .457$  (see Table 28 and Table 29 for full results).

**Table 28.** *Descriptive statistic comparisons based on gender of participants*

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
59	59	1.69	.464	.060	1.57	1.82	1	2
88	88	1.69	.464	.049	1.59	1.79	1	2
515	515	1.75	.436	.019	1.71	1.78	1	2
Total	662	1.73	.442	.017	1.70	1.77	1	2

**Table 29.** *ANOVA results based on gender of participants*

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.306	2	.153	.783	.457
Within Groups	128.902	659	.196		
Total	129.208	661			

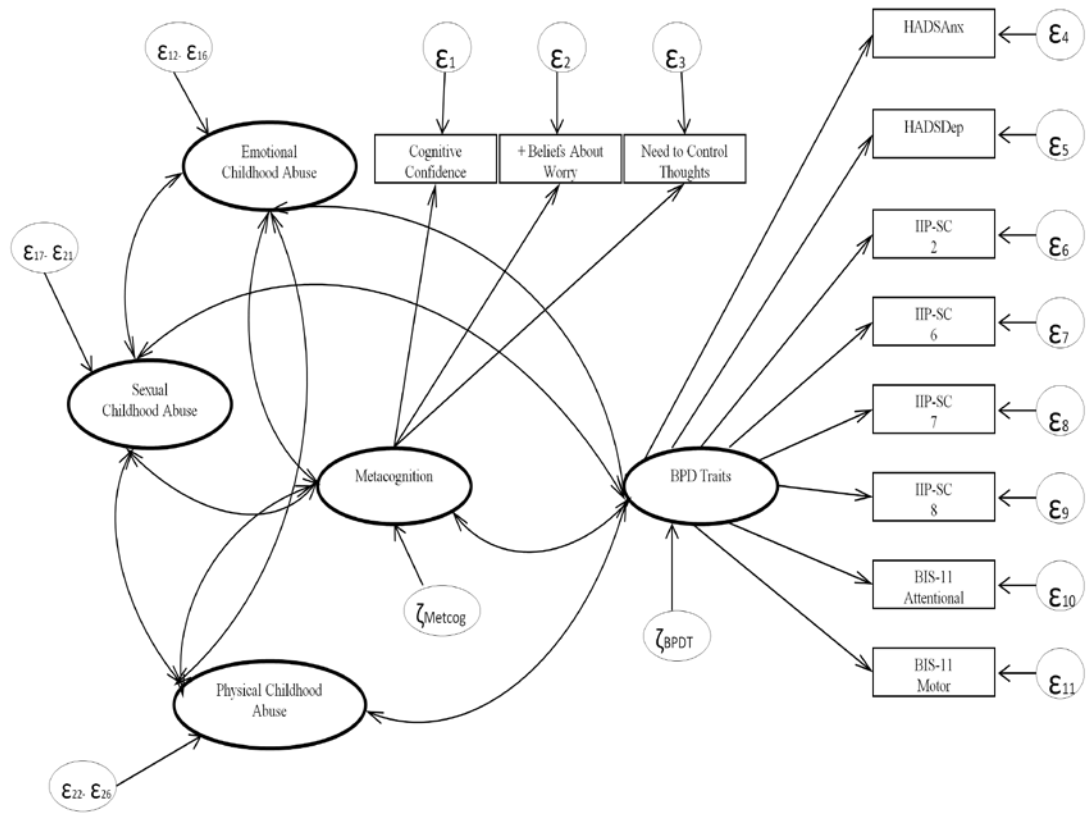
## 4.2 Model I: Childhood Maltreatment-Metacognition-Borderline Personality Traits

The first model consisted of five first order latent constructs that defined the areas of interest and accounted for the relationship between childhood maltreatment and the BPD traits composite with metacognition as the sole proposed mediator in this relationship (see Figure 13, Figure 14, and Figure 15). This model also consisted of eleven second order latent factors. Eight of these second order factors were used specifically to construct the latent variable BPD traits (see section 3.5 for in-depth explanation), and the remaining three factors were used to construct the latent variable metacognition (see section 3.4.3). The results of the CFA for the revised model indicated that this model was a good fit to the data:  $\chi^2$  (2748,  $N = 574$ ) = 4275,  $p < .001$ ; RMSEA = .03 (90% CI = .029 - .033); CFI = .93 and TLI = .93 (please see Table 30).

**Table 30.** *General Model I*

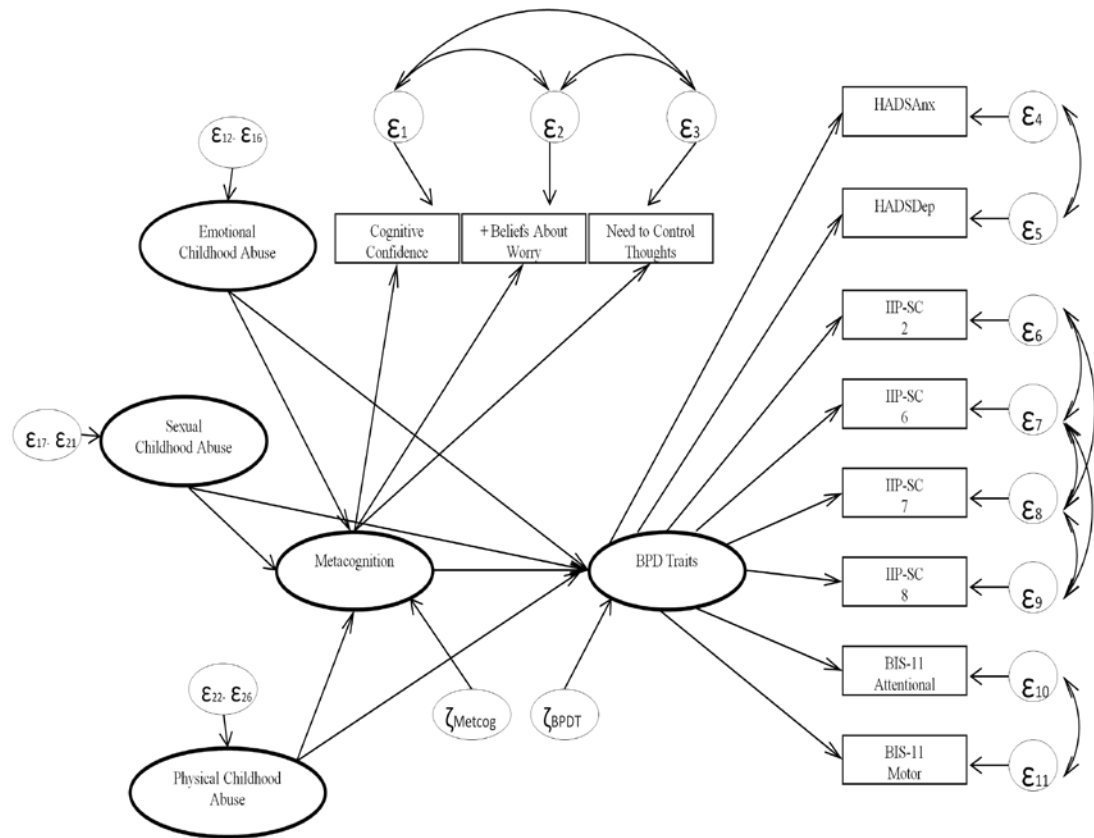
<i>Model</i>	<i>Overall <math>\chi^2</math></i>	<i>df</i>	<i>RMSEA</i>	<i>CI for RMSEA</i>	<i>CFI</i>	<i>TLI</i>
<i>Measurement Model</i>						
<i>(Saturated)</i>	4849.37*	2754	.036	.035 - .038	.903	.900
<i>Revised Model</i>	4275.48*	2748	.031	.029 - .033	.930	.927
<i>Structural Model</i>	4202.15*	2744	.030	.029 - .032	.933	.930

*Note.*  $N = 574$ . RMSEA = root-mean square error of approximation; CFI = comparative fit index; TFI = Tucker Lewis index. \*  $p < .001$ .



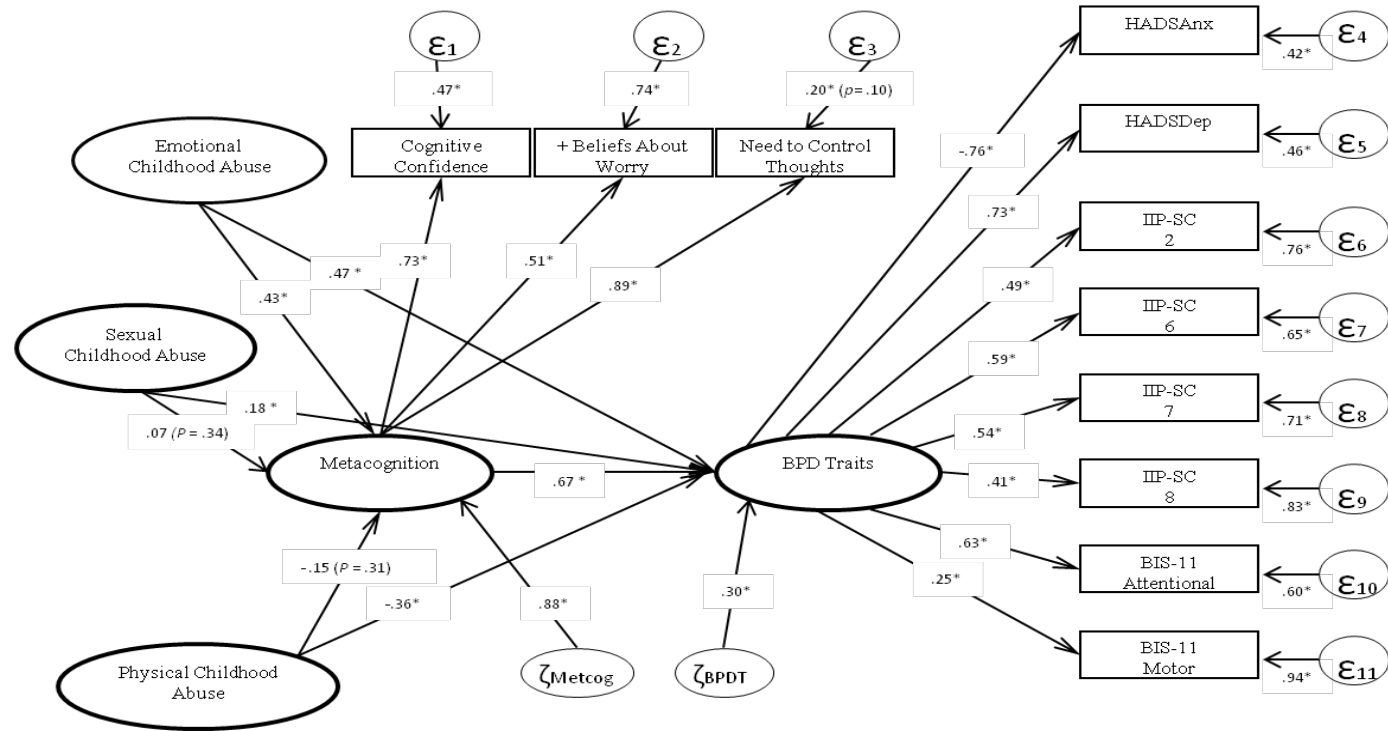
**Figure 13. Model I: Confirmatory Factor Analysis with saturated covariances among factors (Measurement Model) for the hypothesized relationship between childhood maltreatment and BPD traits mediated by metacognition.**

*Measurement Model (Model I,  $N = 574$ ).* The ovals represent the first order latent constructs, and the boxes are used to represent the second order latent constructs; One-headed arrows represent regression relationships, while two-headed arrows represent correlational relationships; *BPD* = *Borderline Personality Disorder* traits; *HADSAnx* = anxiety sub-scale from the *HADS*; *HADSDep* = depression sub-scale from the *HADS*; *IIP-SC 2* = vindictive/self-centered sub-scale from the *IIP-SC*; *IIP-SC 6* = overly accommodating sub-scale from the *IIP-SC*; *IIP-SC 7* = self-sacrificing sub-scale from the *IIP-SC*; *IIP-SC 8* = intrusive/needy sub-scale from the *IIP-SC*; *BIS-11 attentional* = attentional impulsiveness sub-scale from the *BIS-11*; *motor* = motor impulsiveness sub-scale from the *BIS-11*.



**Figure 14. Model I: Revised Model for the hypothesized relationship between childhood maltreatment and BPD traits mediated by metacognition.**

*Revised Model (Model I,  $N = 574$ ).* The ovals represent the first order latent constructs, and the boxes are used to represent the second order latent constructs; One-headed arrows represent regression relationships, while two-headed arrows represent correlational relationships; *BPD* = *Borderline Personality Disorder* traits; *HADSAnx* = *anxiety sub-scale from the HADS*; *HADSDep* = *depression sub-scale from the HADS*; *IIP-SC 2* = *vindictive/self-centered sub-scale from the IIP-SC*; *IIP-SC 6* = *overly accommodating sub-scale from the IIP-SC*; *IIP-SC 7* = *self-sacrificing sub-scale from the IIP-SC*; *IIP-SC 8* = *intrusive/needy sub-scale from the IIP-SC*; *BIS-11 attentional* = *attentional impulsiveness sub-scale from the BIS-11*; *motor* = *motor impulsiveness sub-scale from the BIS-11*.



**Figure 15. Model I: Structural Model for the hypothesized relationship between childhood maltreatment and BPD traits mediated by metacognition.**

*Measurement Model (Model I, N = 574).* The ovals represent the first order latent constructs, and the boxes are used to represent the second order latent constructs; One-headed arrows represent regression relationships, while two-headed arrows represent correlational relationships; *BPD* = *Borderline Personality Disorder* traits; *HADSAnx* = *anxiety sub-scale from the HADS*; *HADSDep* = *depression sub-scale from the HADS*; *IIP-SC 2* = *vindictive/self-centered sub-scale from the IIP-SC*; *IIP-SC 6* = *overly accommodating sub-scale from the IIP-SC*; *IIP-SC 7* = *self-sacrificing sub-scale from the IIP-SC*; *IIP-SC 8* = *intrusive/needy sub-scale from the IIP-SC*; *BIS-11 attentional* = *attentional impulsiveness sub-scale from the BIS-11*; *motor* = *motor impulsiveness sub-scale from the BIS-11*.

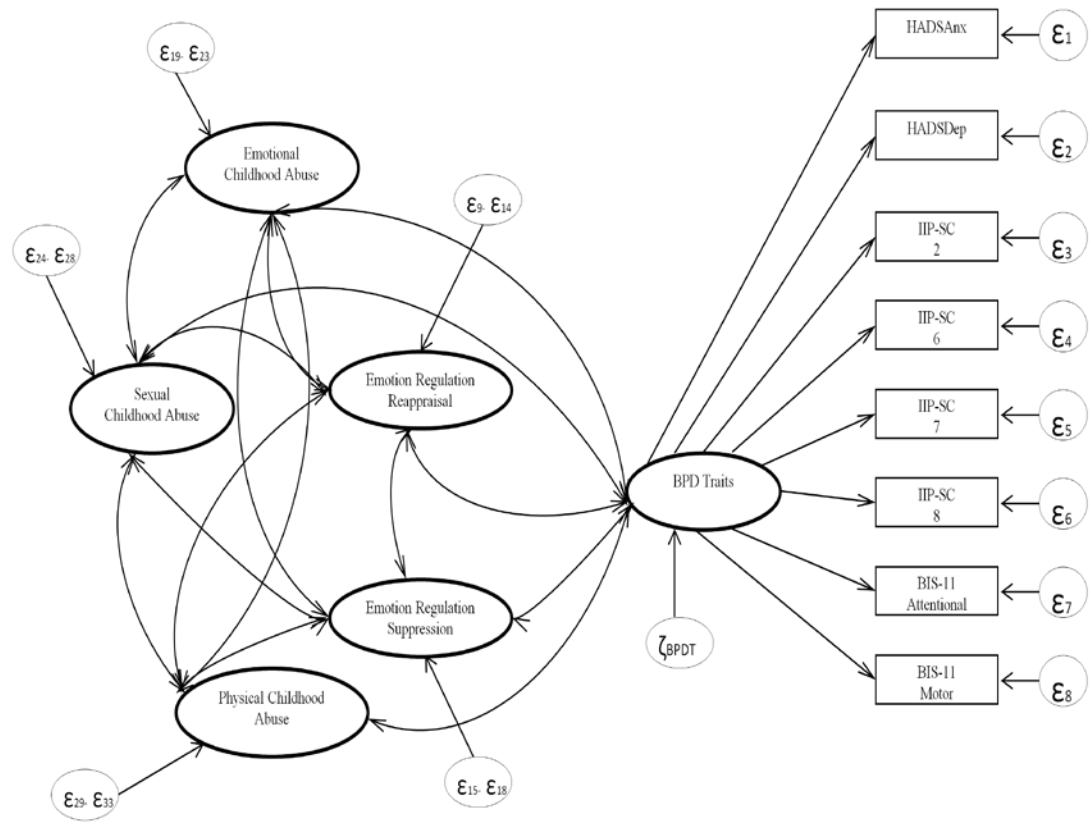
### 4.3 Model II: Childhood Maltreatment-Emotion Regulation-Borderline Personality Traits

The second model consisted of six first order latent constructs that defined the areas of interest for this research and accounted for the relationship between childhood maltreatment and the composite BPD associated features, with emotion regulation suppression and lack of emotion regulation reappraisal as proposed mediators in this relationship (see Figure 16, Figure 17, and Figure 18). This model also consisted of eight second order factors that accounted for the latent construct BPD traits. The results of a CFA for the revised model indicated that this model was a good fit to the data:  $\chi^2(2182, N = 574) = 3938, p < .001$ ; RMSEA = .04 (90% CI = .036 -.039); CFI = .90 and TLI = .90 (see Table 31).

**Table 31.** *General Model II*

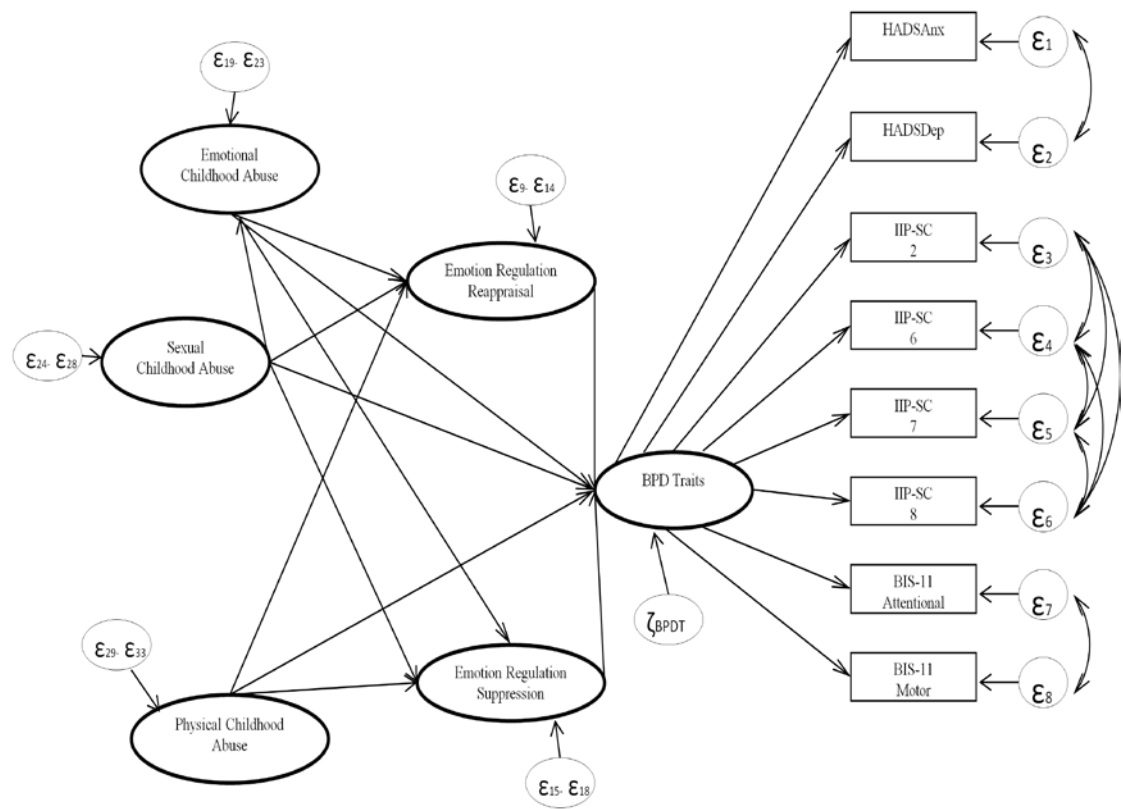
<i>Model</i>	<i>Overall <math>\chi^2</math></i>	<i>df</i>	<i>RMSEA</i>	<i>CI for RMSEA</i>	<i>CFI</i>	<i>TLI</i>
<i>Measurement Model</i>						
<i>(Saturated)</i>	4613.35*	2188	.044	.042 - .046	.874	.868
<i>Revised Model</i>	3938.83*	2182	.037	.036 - .039	.908	.904
<i>Structural Model</i>	3934.61*	2183	.037	.036 - .039	.909	.905

*Note.*  $N = 574$ . RMSEA = root-mean square error of approximation; CFI = comparative fit index; TFI = Tucker Lewis index. \*  $p < .001$ .



**Figure 16. Model II: Confirmatory Factor Analysis with saturated covariances among factors (Measurement Model) for the hypothesized relationship between childhood maltreatment and BPD traits mediated by emotion regulation suppression and emotion regulation reappraisal.**

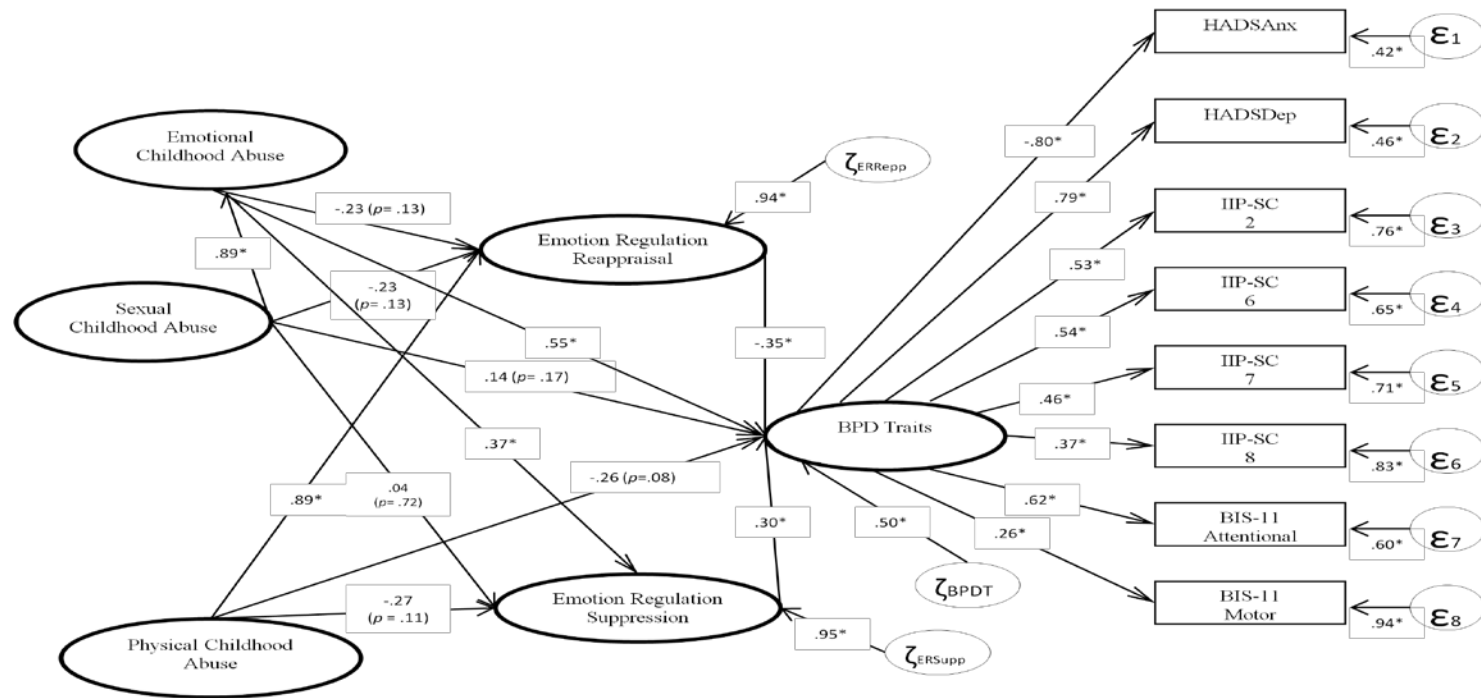
*Measurement Model (Model II, N = 574).* The ovals represent the first order latent constructs, and the boxes are used to represent the second order latent constructs; One-headed arrows represent regression relationships, while two-headed arrows represent correlational relationships; *BPDT* = *Borderline Personality Disorder traits*; *HADSAnx* = *anxiety sub-scale from the HADS*; *HADSDep* = *depression sub-scale from the HADS*; *IIP-SC 2* = *vindictive/self-centered sub-scale from the IIP-SC*; *IIP-SC 6* = *overly accommodating sub-scale from the IIP-SC*; *IIP-SC 7* = *self-sacrificing sub-scale from the IIP-SC*; *IIP-SC 8* = *intrusive/needy sub-scale from the IIP-SC*; *BIS-11 attentional* = *attentional impulsiveness sub-scale from the BIS-11*; *motor* = *motor impulsiveness sub-scale from the BIS-11*.



**Figure 17. Model II: Revised Model for the hypothesized relationship between childhood maltreatment and BPD traits mediated by emotion regulation suppression and emotion regulation reappraisal.**

*Revised Model (Model II, N = 574).* The ovals represent the first order latent constructs, and the boxes are used to represent the second order latent constructs; One-headed arrows represent regression relationships, while two-headed arrows represent correlational relationships; *BPD* = *Borderline Personality Disorder* traits; *HADSAnx* = anxiety sub-scale from the *HADS*; *HADSDep* = depression sub-scale from the *HADS*; *IIP-SC 2* = vindictive/self-centered sub-scale from the *IIP-SC*; *IIP-SC 6* = overly accommodating sub-scale from the *IIP-SC*; *IIP-SC 7* = self-sacrificing sub-scale from the *IIP-SC*; *IIP-SC 8* = intrusive/needy sub-scale from the *IIP-SC*; *BIS-11 attentional* = attentional impulsiveness sub-scale from the *BIS-11*; *motor* = motor impulsiveness sub-scale from the *BIS-11*.





**Figure 18. Model II: Structural Model for the hypothesized relationship between childhood maltreatment and BPD traits mediated by emotion regulation suppression and emotion regulation reappraisal.**

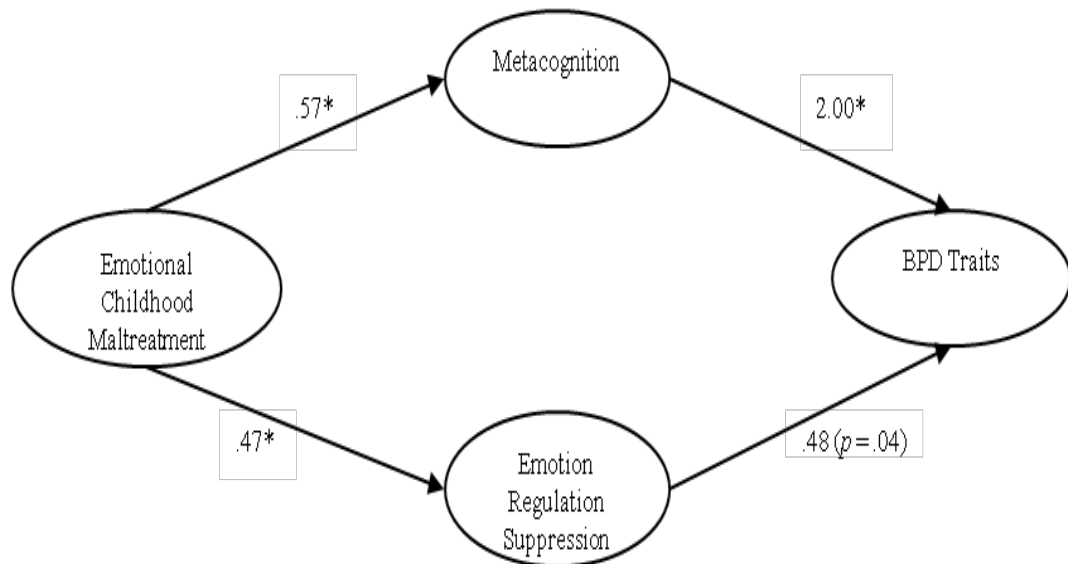
*Measurement Model (Model II, N = 574).* The ovals represent the first order latent constructs, and the boxes are used to represent the second order latent constructs; One-headed arrows represent regression relationships, while two-headed arrows represent correlational relationships; *BPDT* = *Borderline Personality Disorder traits*; *HADSAnx* = *anxiety sub-scale from the HADS*; *HADSDep* = *depression sub-scale from the HADS*; *IIP-SC 2* = *vindictive/self-centered sub-scale from the IIP-SC*; *IIP-SC 6* = *overly accommodating sub-scale from the IIP-SC*; *IIP-SC 7* = *self-sacrificing sub-scale from the IIP-SC*; *IIP-SC 8* = *intrusive/needy sub-scale from the IIP-SC*; *BIS-11 attentional* = *attentional impulsiveness sub-scale from the BIS-11*; *motor* = *motor impulsiveness sub-scale from the BIS-11*.

#### 4.3.1 Sub-Model 1

*The Role of Metacognition and Emotion Regulation Suppression as Mediators in the Relationship between Emotional Childhood Maltreatment and Borderline Personality Traits.*

The purpose of this sub-model was to investigate whether metacognition and/or emotion regulation suppression mediated the relationship between emotional childhood maltreatment and Borderline Personality Disorder traits. The structural model was assessed following Holmbeck's three-step approach. First, the direct path coefficient from the predictor (emotional childhood maltreatment) to the criterion (BPD traits) without the mediating latent variables (metacognition and emotion regulation suppression) was measured. The results found this relationship to be significant ( $b = 1.64$ ,  $p = .000$ ). Then, a partially mediated model adding the mediating paths of metacognition and emotion regulation suppression to the direct path from the predictor to the criterion was assessed. The results indicated a partial fit to the data:  $\chi^2(2392, N = 574) = 4732$ ,  $p < .001$ ; RMSEA = .04 (90% CI = .040 - .043); CFI = .88 and TLI = .88. And last, a fully mediated model constraining the direct path coefficient between emotional childhood maltreatment and BPD traits was tested. The results indicated this model was also a partial fit to the data:  $\chi^2(2393, N = 574) = 4731$ ,  $p < .001$ ; RMSEA = .04 (90% CI = .040 - .043); CFI = .88 and TLI = .88. It is important to note that the relationship between emotion regulation suppression and BPD traits was found to be barely significant ( $p = .48$ ). According to Holmbeck, this would indicate that there is a high probability that emotion regulation suppression does not mediate the relationship between emotional childhood maltreatment and BPD traits. After testing for difference in model fit using the chi-square difference test (difftest), the comparison between the partially mediated model and the fully mediated model was not statistically significant [4.371 (1),  $p = .056$ ] indicating that the null hypothesis ( $H_0$ ) had to be accepted and therefore that the more constrained model (the fully mediated model in this case-see Figure 19) had to be kept (see Table 32 for full model information).

As previously stated, the purpose of a “difftest” is to compare the model with the “most free” parameters (the least constrained model, or H1) with a nested model (a model with fewer free parameters, or H0). If the result of the “difftest” is significant ( $p < .05$ ), the least constrained model (H1) is accepted as the model that best fits the data. However, if the result is not significant ( $p > .05$ ), then the nested model (H0) is considered the best fitting model (see section 3.9 for a full explanation).



**Figure 19. The Fully Mediate Model for Sub-Model 1. \*  $p < .002$ .**

Under Anderson and Gerbing’s approach two more models were assessed: a direct model and a null model. According to Anderson and Gerbing (1998), the null model does not need to be estimated, and only the degrees of freedom have to be calculated; however, since Mplus was used and the degrees of freedom are part of the output when a full estimation is performed, the information for the null model was included in the results section for all sub-models. The results for the direct model indicated a borderline fit to the data:  $\chi^2(2393, N = 574) = 5140, p < .001$ ; RMSEA = .04 (90% CI = .043 - .046); CFI = .86 and TLI = .85 (see Table 32). When the direct model was compared with the partially mediated model for difference in model fit using the difftest, the comparison was statistically significant [142.61 (1),  $p < .001$ ] indicating that H0 had to be rejected and the least constrained model (the partially mediated

model) had to be acknowledged as the better fit to the data. The results for the null model indicated a poor fit to the data:  $\chi^2(2397, N = 574) = 8274, p < .001$ ; RMSEA = .07 (90% CI = .064 - .067); CFI = .70 and TLI = .69. Since this model did not fit the data, testing for difference in model fit was not necessary. Consequently, the two models that best fit the data in both Holmbeck's approach and Anderson and Gerbing's approach, were the partially and the fully mediated models. And since a difference in model fit comparison between these two models had already indicated the more constrained model had to be kept, the fully mediated model was selected as the model that best fit the data (see Table 32).

A SEM analysis of the data using the fully mediated model to assess for the standardized mediational effects of the mediators indicated that metacognition partially mediated the relationship between emotional childhood abuse and BPD traits. More specifically, metacognition significantly predicted BPD traits ( $b = 2.00, SE = .98, \beta = .86, p < .04$ ), and was also significantly related to emotional childhood maltreatment ( $b = .57, SE = .09, \beta = .49, p < .001$ ). As expected from these results, the indirect effect tested using bootstrapped standard errors (see Table 33) was also significant ( $b = 1.15, SE = .53, p < .03$ ).

The mediational effects of emotion regulation suppression were not significant. Even though the relationship between emotion regulation suppression and emotional childhood maltreatment was significant ( $b = .47, SE = .09, \beta = .42, p < .001$ ), the relationship between emotion regulation suppression and BPD traits was barely significant ( $b = .48, SE = .32, \beta = .20, p = .49$ ). Consequently, when the indirect effect was tested using bootstrapped standard errors (see Table 33) the mediational effects of emotion regulation suppression became not significant ( $b = .23, SE = .12, p = .057$ ). These findings supported the hypothesized mediational model for metacognition but not for emotion regulation suppression.

**Table 32.** *Sub-Model 1 alternative models*

<i>Model</i>	<i>Overall <math>\chi^2</math></i>	<i>df</i>	<i>RMSEA</i>	<i>CI for RMSEA</i>	<i>CFI</i>	<i>TLI</i>	<i><math>\Delta \chi^2</math> (df)</i>
<i>Saturated</i>	4485.97*	2391	.039	.037 - .041	.893	.889	
<i>Direct</i>	5140.23*	2393	.045	.043 - .046	.859	.854	<sup>(1)</sup> 142.61 (1) <i>p</i> = .000
<i>Partial</i>	4432.41*	2392	.041	.040 - .043	.880	.876	<sup>(2)</sup> 4.371 (1) <i>p</i> = .056
<i>Full</i>	4731.30*	2393	.041	.040 - .043	.880	.876	(Model that best fit the data)
<i>Null</i>	8274.28*	2397	.065	.064 - .067	.699	.688	

*Note.* *N* = 574. RMSEA = root-mean square error of approximation; CFI = comparative fit index; TFI = Tucker Lewis index; Saturated model = all parameters estimated; Direct model = the effects of the predictor on the criterion in the absence of the mediators estimated; Partial model = the direct path from the predictor to the criterion in addition to the mediating paths estimated; Full model = the mediating paths without the direct path from the predictor to the criterion estimated; Null model = all parameters fixed at zero. <sup>(1)</sup> Diff test results comparing the partial model with the direct model (the partial model had to be kept); <sup>(2)</sup> Diff test results comparing the partial model with the full model (*p* = .056) indicated the full model was the best fit to the data. \* *ps* < .001.

**Table 33.** *Mediation Results (Bootstrapped Effect Sizes) - The effects of Emotion Regulation Suppression and Metacognition as mediators in the Relationship between Emotional Childhood Maltreatment and BPD traits*

<b>Indirect Effects</b>				<b>Confidence Intervals</b>		
<b>Mediator</b>	<b>Estimate</b>	<b>S.E.</b>	<b><i>P</i>-Value</b>	<b>Lower 5%</b>	<b>Estimate</b>	<b>Upper 5%</b>
METACOG	1.15	.536	.032	.271	1.15	2.03
ERSupp	.230	.121	.057	.031	.230	.429
Total Indirect Effect	1.38	.618	.025	.368	1.38	2.39

*Note.* *N* = 574. METACOG = Metacognition; ERSupp = Emotion Regulation Suppression.

#### 4.3.2 Sub-Model 2

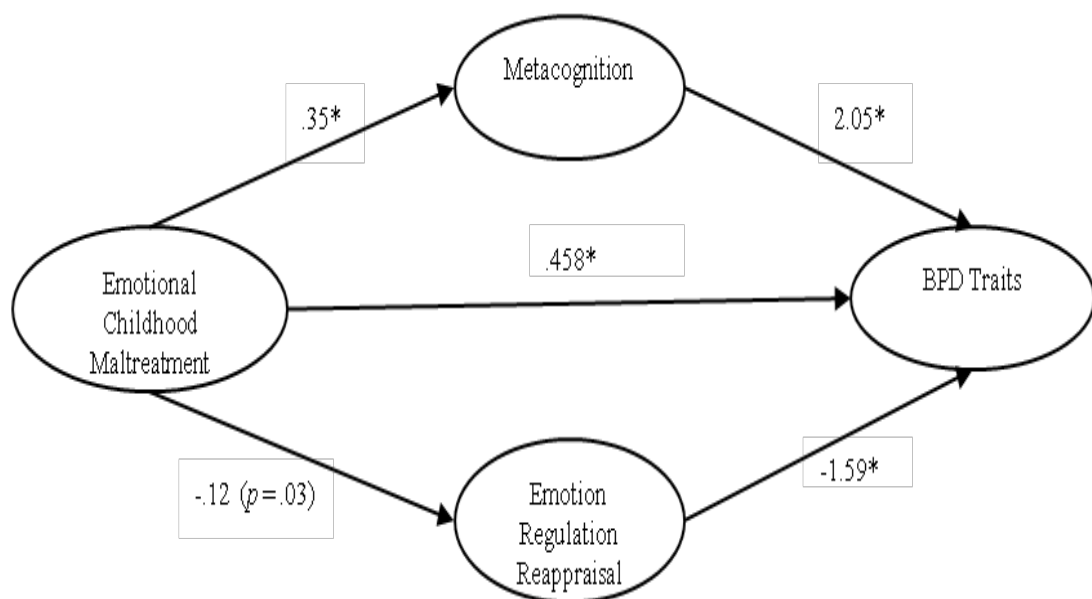
*The Role of Metacognition and lack of Emotion Regulation Reappraisal as Mediators in the Relationship between Emotional Childhood Maltreatment and Borderline Personality Traits.*

The purpose of this sub-model was to investigate the role of metacognition and lack of emotion regulation reappraisal as mediators in the relationship between emotional childhood maltreatment and Borderline Personality Disorder traits. Starting with Holmbeck's three-step approach, the direct path coefficient from the predictor (emotional childhood maltreatment) to the criterion (BPD traits) without the mediating latent variables (metacognition and lack of emotion regulation reappraisal) was measured. This relationship was found to be significant ( $b = 1.870$ ,  $p < .001$ ). Then, a partially mediated model adding the mediating paths of metacognition and lack of emotion regulation reappraisal to the direct path from the predictor to the criterion was assessed. The results indicated this model was a good fit to the data:  $\chi^2$  (2463,  $N = 574$ ) = 4485,  $p < .001$ ; RMSEA = .04 (90% CI = .036 - .040); CFI = .90 and TLI = .89. After that, a fully mediated model was assessed. The results indicated the fully mediated model, just like the partially mediated model, was a good fit to the data:  $\chi^2$  (2464,  $N = 574$ ) = 4503,  $p < .001$ ; RMSEA = .04 (90% CI = .036 - .040); CFI = .90 and TLI = .89. After testing for difference in model fit between all three models using the difftest, the comparison between direct model (Holmbeck's first step) and the partial model (Holmbeck's second step) was statistically significant [179.97 (1),  $p = .000$ ] which indicated the least constrained model of the two (the partial model) had to be acknowledged as the best fit to the data. When the partial and the full model (Holmbeck's third step) were compared, the results indicated both models fit the data well, however, a difference in model fit comparison was statistically significant [9.185 (1),  $p = .002$ ] which indicated the least constrained model (the partially mediated model, see Figure 20) had to be chosen as the model that best fit the data (see Table 34 for full model information).

Following Anderson and Gerbing's approach, the null model was assessed in addition to the direct, the partial, and the full models already assessed following

Holbeck's approach. The results indicated this model was a poor fit to the data:  $\chi^2$  (2468,  $N = 574$ ) = 8122,  $p < .001$ ; RMSEA = .06 (90% CI = .062 - .065); CFI = .71 and TLI = .70. As with sub-model 1, since this model did not fit the data, testing for difference in model fit was not necessary. In this case, the two models that best fit the data in both Holmbeck's approach and Anderson and Gerbing's approach, were the partially and the fully mediated models, and since the partially mediated model was slightly better (per difftest comparison), it was selected as the model that best fit the data (see Table 34 for full model information).

A SEM analysis of the data using the partially mediated model to assess for the standardized mediational effects of the mediators corroborated the results from sub-model 1 indicating that metacognition partially mediated the relationship between emotional childhood abuse and BPD traits as metacognition significantly predicted BPD traits ( $b=2.05$ ,  $SE = .84$ ,  $\beta = .77$ ,  $p < .01$ ), and was also significantly related to emotional childhood maltreatment ( $b=.36$ ,  $SE = .06$ ,  $\beta = .34$ ,  $p < .001$ ). As expected from these results, the indirect effect tested using bootstrapped standard errors (see Table 35) was also significant ( $b= .73$ ,  $SE = .34$ ,  $p < .03$ ).



**Figure 20. The Partially Mediated Model for Sub-Model 2. \*  $p < .002$ .**

**Table 34.** *Sub-Model 2 alternative models*

<i>Model</i>	<i>Overall <math>\chi^2</math></i>	<i>df</i>	<i>RMSEA</i>	<i>CI for RMSEA</i>	<i>CFI</i>	<i>TLI</i>	<i><math>\Delta \chi^2</math> (df)</i>
<i>Saturated</i>	4448.09*	2462	.037	.036 - .039	.900	.896	
<i>Direct</i>	5157.25*	2464	.044	.042 - .045	.864	.859	<sup>(1)</sup> 179.97 (1) <i>p</i> = .000
<i>Partial</i>	4485.48*	2463	.038	.038 - .040	.898	.894	(Model that best fit the data)
<i>Full</i>	4503.62*	2464	.038	.036 - .040	.897	.893	<sup>(2)</sup> 9.185 (1) <i>p</i> = .002
<i>Null</i>	8122.07*	2468	.063	.062 - .065	.714	.704	

*Note.* *N* = 574. RMSEA = root-mean square error of approximation; CFI = comparative fit index; TFI = Tucker Lewis index; Saturated model = all parameters estimated; Direct model = the effects of the predictor on the criterion in the absence of the mediators estimated; Partial model = the direct path from the predictor to the criterion in addition to the mediating paths estimated; Full model = the mediating paths without the direct path from the predictor to the criterion estimated; Null model = all parameters fixed at zero. <sup>(1)</sup> Diff test results comparing the partial model with the direct model (the partial model had to be kept); <sup>(2)</sup> Diff test results comparing the partial model with the full model (*p* = .002) indicated that the partial model remained the model that best fit the data). \* *ps* < .001.

However, contrary to what was observed when utilising Holmbeck's approach, the analysis of the results using bootstrapped standard error did not find the mediational effects of the lack of emotion regulation reappraisal significant. Even though the relationship between the lack of emotion regulation reappraisal and BPD traits was significant ( $b = -1.05$ ,  $SE = .47$ ,  $\beta = -.37$ ,  $p < .03$ ), the relationship between lack of emotion regulation reappraisal and emotional childhood maltreatment was not ( $b = -.117$ ,  $SE = .06$ ,  $\beta = -.116$ ,  $p = .06$ ). When the indirect effect was tested using bootstrapped standard errors (see Table 35) the mediational effects of the lack of emotion regulation reappraisal became not significant ( $b = .12$ ,  $SE = .11$ ,  $p = .24$ ). Hence, these findings corroborated the hypothesized mediational effects of metacognition in the relationship between emotional childhood maltreatment and BPD traits. However, the findings did not support the mediational interaction of the lack of emotion regulation reappraisal.



**Table 35.** *Mediation Results (Bootstrapped Effect Sizes) - The effects of lack of Emotion Regulation Reappraisal and Metacognition as mediators in the Relationship between Emotional Childhood Maltreatment and BPD traits*

Mediator	Indirect Effects			Confidence Intervals		
	Estimate	S.E.	P-Value	Lower 5%	Estimate	Upper 5%
METACOG	.736	.336	.029	.183	.736	1.28
ERRepp	.123	.106	.246	-.051	.123	.297
Total Indirect Effect	.859	.425	.043	.159	.859	1.55

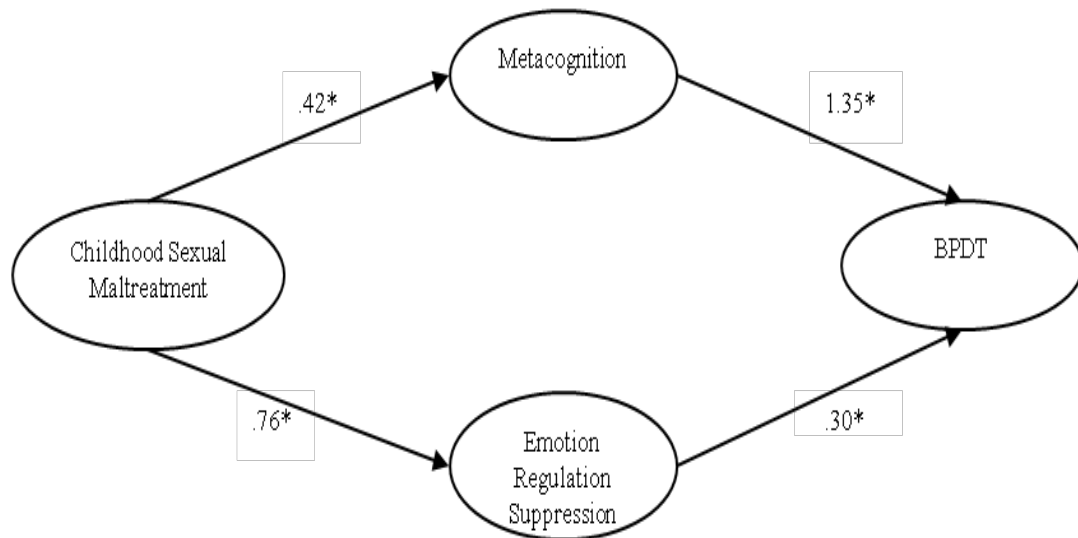
*Note.*  $N = 574$ . METACOG = Metacognition; ERRepp = Lack of Emotion Regulation Reappraisal.

#### 4.3.3 Sub-Model 3

*The Role of Metacognition and Emotion Regulation Suppression as Mediators in the Relationship between Sexual Childhood Maltreatment and Borderline Personality Traits.*

The purpose of this sub-model was to investigate the role of metacognition and emotion regulation suppression as mediators in the relationship between sexual childhood maltreatment and Borderline Personality Disorder traits. First, the structural model was analyzed following Holmbeck's three-step approach by measuring the direct path coefficient from the predictor (sexual childhood maltreatment) to the criterion (BPD traits) without the mediating latent variables (metacognition and emotion regulation suppression). This relationship was found to be significant ( $b = 1.52, p < .001$ ). After that, a partially mediated model adding the mediating paths of metacognition and emotion regulation suppression to the direct path from the predictor to the criterion was assessed. The results indicated a good fit to the data:  $\chi^2 (2325, N = 574) = 4576, p < .001$ ; RMSEA = .04 (90% CI = .039 - .043); CFI = .89 and TLI = .89. And last, a fully mediated model constraining the direct path coefficient between sexual childhood maltreatment and BPD traits was

tested. The results indicated this model was also a good fit to the data:  $\chi^2$  (2326,  $N = 574$ ) = 4538,  $p < .001$ ; RMSEA = .04 (90% CI = .039 - .042); CFI = .89 and TLI = .89. After testing for difference in model fit between the fully mediated model and the partially mediated model using the difftest, the comparison was not statistically significant [2.791 (1),  $p = .094$ ]. This indicated that the more constrained model (the fully mediated model-see Figure 21) was the model that best fit the data (see Table 36 for full model information).



**Figure 21. The Fully Mediated Model for Sub-Model 3. \*  $p < .001$ .**

Employing Anderson and Gerbing's approach, the results for the direct model showed a fair fit to the data:  $\chi^2$  (2326,  $N = 574$ ) = 4925,  $p < .001$ ; RMSEA = .04 (90% CI = .042 - .046); CFI = .87 and TLI = .87. Yet, when compared with the partially mediated model for difference in model fit using the difftest, the comparison was significant [166.8 (1),  $p < .001$ ], which meant that the partially mediated model was a better fit to the data. Following Anderson and Gerbin's approach, one more model was assessed in addition to the direct, the partial and full models already assessed; a null model. The assessment results for the null model indicated a poor fit to the data:  $\chi^2$  (2330,  $N = 574$ ) = 7567,  $p < .001$ ; RMSEA = .06 (90% CI = .061 - .064); CFI = .75 and TLI = .74. Since the difference between this model and the partially and fully mediated models was obvious, testing for difference in model fit was not

necessary. Consequently, the two models that better fit the data, as in Holmbeck's approach, were the partially and the fully mediated models. In consequence, taking under consideration the results of the difference in model fit, the fully mediated model was selected as the model that best fit the data.

**Table 36.** *Sub-Model 3 alternative models*

<i>Model</i>	<i>Overall <math>\chi^2</math></i>	<i>df</i>	<i>RMSEA</i>	<i>CI for RMSEA</i>	<i>CFI</i>	<i>TLI</i>	<i><math>\Delta \chi^2</math> (df)</i>
<i>Saturated</i>	4247.63*	2323	.038	.036 - .040	.907	.903	
<i>Direct</i>	4925.35*	2326	.044	.042 - .046	.874	.870	<sup>(1)</sup> 140.76 (1) <i>p</i> = .000
<i>Partial</i>	4576.51*	2325	.041	.039 - .043	.891	.887	<sup>(2)</sup> 2.791 (1) <i>p</i> = .094
<i>Full</i>	4538.96*	2326	.041	.039 - .42	.893	.889	(Model that best fit the data)
<i>Null</i>	7567.74*	2330	.063	.061 - .064	.747	.738	

*Note.* *N* = 574. RMSEA = root-mean square error of approximation; CFI = comparative fit index; TFI = Tucker Lewis index; Saturated model = all parameters estimated; Direct model = the effects of the predictor on the criterion in the absence of the mediators estimated; Partial model = the direct path from the predictor to the criterion in addition to the mediating paths estimated; Full model = the mediating paths without the direct path from the predictor to the criterion estimated; Null model = all parameters fixed at zero. <sup>(1)</sup> Difftest results comparing the partial model with the direct model (the partial was kept as it was a better fit to the data); <sup>(2)</sup> Difftest results comparing the partial model with the full model (*p* = .094) indicating the full model had to be kept as it was a better fit to the data.

\* *p*s < .001.

A SEM analysis of the data using the fully mediated model to assess for the standardized mediational effects of the mediators indicated that metacognition partially mediated the relationship between sexual childhood abuse and BPD traits. Metacognition significantly predicted BPD traits ( $b=1.35$ ,  $SE = .20$ ,  $\beta = .78$ ,  $p < .001$ ), and was also found to be significantly related to sexual childhood maltreatment ( $b=.42$ ,  $SE = .07$ ,  $\beta = .39$ ,  $p < .001$ ). The indirect effect tested using bootstrapped standard errors (see Table 37) was also significant ( $b=.57$ ,  $SE = .10$ ,  $p < .001$ ). In addition, the results indicated that emotion regulation suppression partially mediated the relationship between sexual childhood abuse and BPD traits. Emotion regulation suppression significantly predicted BPD traits ( $b = .30$ ,  $SE = .14$ ,  $\beta = .20$ ,  $p < .04$ ), and was also significantly related to sexual childhood maltreatment ( $b= .76$ ,  $SE = .22$ ,  $\beta = .61$ ,  $p < .001$ ). The indirect effect tested using bootstrapped standard errors (see Table 37) was also significant ( $b = .23$ ,  $SE = .07$ ,  $p < .002$ ). These findings supported the hypothesized mediational model for both metacognition and emotion regulation suppression.

**Table 37.** *Mediation Results (Bootstrapped Effect Sizes) - The effects of Emotion Regulation Suppression and Metacognition as mediators in the Relationship between Sexual Childhood Maltreatment and BPD traits*

Indirect Effects				Confidence Intervals		
Mediator	Estimate	S.E.	P-Value	Lower 5%	Estimate	Upper 5%
METACOG	.573	.095	.000	.416	.573	.730
ERSupp	.226	.072	.002	.107	.226	.345
Total Indirect Effect	.799	.116	.000	.609	.799	.990

*Note.*  $N = 574$ . METACOG = Metacognition; ERSupp = Emotion Regulation Suppression.

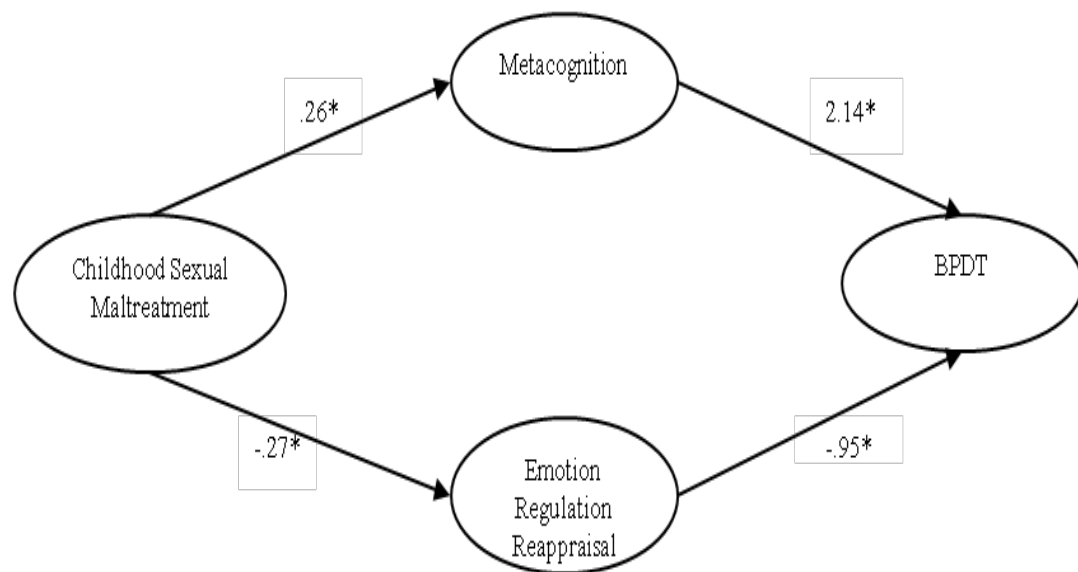
#### 4.3.4 Sub-Model 4

*The Role of Metacognition and the lack of Emotion Regulation Reappraisal as Mediators in the Relationship between Sexual Childhood Maltreatment and Borderline Personality Traits.*

The purpose of this sub-model was to investigate the role of metacognition and the lack of emotion regulation reappraisal as mediators in the relationship between sexual childhood maltreatment and Borderline Personality Disorder traits. The structural model was analyzed following Holmbeck's three-step approach. First, the direct path coefficient from the predictor (sexual childhood maltreatment) to the criterion (BPD traits) without the mediating latent variables (metacognition and the lack of emotion regulation reappraisal) was measured. The results found this relationship to be significant, ( $b = 1.561, p < .001$ ). Then, a partially mediated model adding the mediating paths of metacognition and the lack of emotion regulation reappraisal to the direct path from the predictor to the criterion was assessed. The results indicated this model was a good fit to the data:  $\chi^2(2394, N = 574) = 4258, p < .001$ ; RMSEA = .04 (90% CI = .035 - .039); CFI = .91 and TLI = .90. And last, a fully mediated model, in which the direct path coefficient between sexual childhood maltreatment and BPD traits were constrained, was tested. The results indicated this model was also a good fit to the data:  $\chi^2(2395, N = 574) = 4236, p < .001$ ; RMSEA = .04 (90% CI = .035 - .038); CFI = .91 and TLI = .90. After testing for difference in model fit using the difftest, the comparison between the partially and the fully mediated models was not statistically significant [1.59 (1),  $p = .206$ ]; hence indicating that the more constrained model, the fully mediated model (see Figure 22), had to be acknowledge and kept as the model that best fit the data (see Table 38 for full model information).

The assessment of the direct model following Anderson and Gerbing's approach to minimize model misspecification indicated that the direct model was a partial fit to the data:  $\chi^2(2395, N = 574) = 4826, p < .001$ ; RMSEA = .04 (90% CI = .040 - .044); CFI = .88 and TLI = .88. When compared with the partially mediated model for difference in model fit using the difftest, the comparison was statistically significant

[129.97 (1),  $p < .001$ ], which meant that that the partially mediated model (the least constrained model of the two) was a better fit to the data. Regarding the assessment of the null model, the results indicated the model was a poor fit to the data:  $\chi^2$  (2399,  $N = 574$ ) = 7336,  $p < .001$ ; RMSEA = .06 (90% CI = .058 - .061); CFI = .76 and TLI = .76. Since this model did not fit the data, testing for difference in model fit was not necessary. Therefore, the two models that better fit the data in this approach, as well as in Holmbeck's approach, were the partially and the fully mediated models. Consequently, since a difference in model fit comparison between these two models had already indicated the more constrained model had to be chosen, the fully mediated model was selected as the model that best fit the data (see Table 38 for full model information).



**Figure 22. The Fully Mediated Model for Sub-Model 4. \*  $p < .002$ .**

**Table 38. Sub-Model 4 alternative models**

<i>Model</i>	<i>Overall <math>\chi^2</math></i>	<i>df</i>	<i>RMSEA</i>	<i>CI for RMSEA</i>	<i>CFI</i>	<i>TLI</i>	<i><math>\Delta \chi^2</math> (df)</i>
<i>Saturated</i>	4184.76*	2392	.036	.034 - .038	.914	.911	
<i>Direct</i>	4826.47*	2395	.042	.040 - .044	.883	.879	<sup>(1)</sup> 128.97 (1) <i>p</i> = .000
<i>Partial</i>	4258.33*	2394	.037	.035 - .039	.911	.907	<sup>(2)</sup> 1.599 (1) <i>p</i> = .206
<i>Full</i>	4236.74*	2395	.037	.035 - .038	.912	.908	(Model that best fit the data)
<i>Null</i>	7336.01*	2399	.060	.058 - .061	.763	.755	

*Note.* *N* = 574. RMSEA = root-mean square error of approximation; CFI = comparative fit index; TFI = Tucker Lewis index; Saturated model = all parameters estimated; Direct model = the effects of the predictor on the criterion in the absence of the mediators estimated; Partial model = the direct path from the predictor to the criterion in addition to the mediating paths estimated; Full model = the mediating paths without the direct path from the predictor to the criterion estimated; Null model = all parameters fixed at zero. <sup>(1)</sup> Diff test results comparing the partial model with the direct model (the partial model was a better fit to the data); <sup>(2)</sup> Diff test results comparing the partial model with the full model (*p* = .206) indicating the full model was a better fit to the data. \* *ps* < .001.

A SEM analysis of the data using the fully mediated model to assess for the standardized mediational effects of the mediators indicated that metacognition partially mediated the relationship between sexual childhood abuse and BPD traits. Metacognition significantly predicted BPD traits ( $b = 1.458$ ,  $SE = .454$ ,  $\beta = .766$ ,  $p < .001$ ), and it was also found to be significantly related to sexual childhood maltreatment ( $b = 2.13$ ,  $SE = .67$ ,  $\beta = .83$ ,  $p < .001$ ). The indirect effect tested using bootstrapped standard errors (see Table 39) was also significant ( $b = .59$ ,  $SE = .27$ ,  $p = .036$ ). In addition, the results indicated that the lack of emotion regulation reappraisal partially mediated the relationship between sexual childhood abuse and BPD traits. The lack of emotion regulation reappraisal significantly predicted BPD traits ( $b = -.95$ ,  $SE = .33$ ,  $\beta = .37$ ,  $p < .004$ ), and was also significantly related to sexual childhood maltreatment ( $b = -.27$ ,  $SE = .11$ ,  $\beta = -.26$ ,  $p = .014$ ). The indirect

effect tested using bootstrapped standard errors (see Table 39) was also significant ( $b = .26$ ,  $SE = .12$ ,  $p = .034$ ). These findings supported the hypothesized mediational model for both metacognition and the lack of emotion regulation reappraisal.

**Table 39.** *Mediation Results (Bootstrapped Effect Sizes) - The effects of the lack of Emotion Regulation Reappraisal and Metacognition as mediators in the Relationship between Sexual Childhood Maltreatment and BPD traits*

Indirect Effects				Confidence Intervals		
Mediator	Estimate	S.E.	P-Value	Lower 5%	Estimate	Upper 5%
METACOG	.588	.266	.036	.120	.558	.997
ERRepp	.259	.122	.034	.058	.259	.460
Total Indirect Effect	.817	.349	.019	.243	.817	1.39

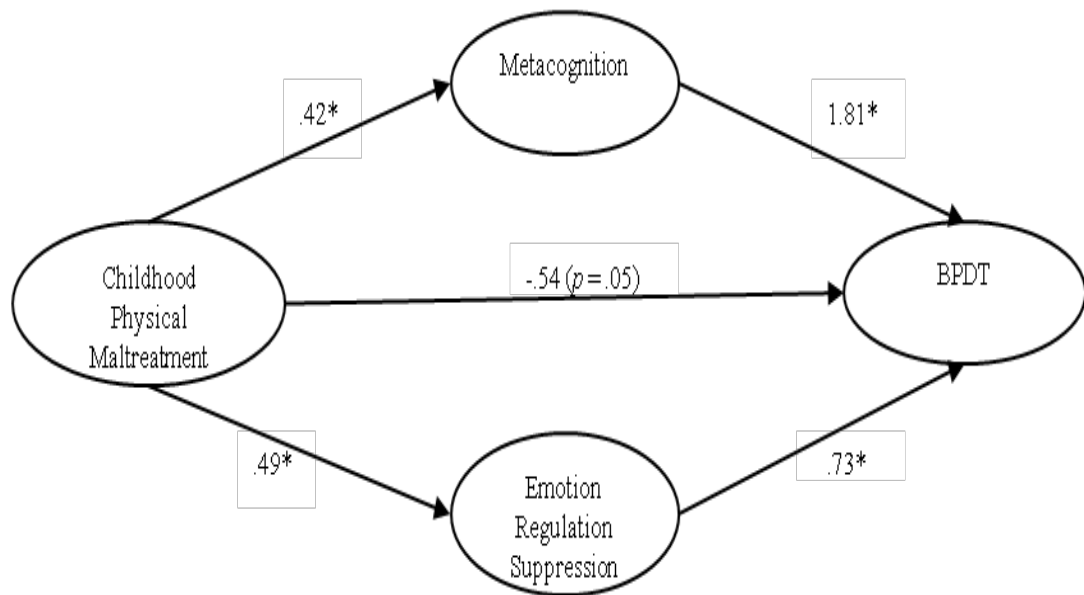
*Note.*  $N = 574$ . METACOG = Metacognition; ERRepp = Lack of Emotion Regulation Reappraisal.



#### 4.3.5 Sub-Model 5

##### *The Role of Metacognition and Emotion Regulation Suppression as Mediators in the Relationship between Physical Childhood Maltreatment and Borderline Personality Traits.*

The purpose of this sub-model was to investigate the role of metacognition and emotion regulation suppression as mediators in the relationship between physical childhood maltreatment and Borderline Personality Disorder traits. The structural model was analyzed first following Holmbeck's three-step approach. Thus, the direct path coefficient from the predictor (physical childhood maltreatment) to the criterion (BPD traits) without the mediating latent variables (metacognition and emotion regulation suppression) was measured. The results found this relationship to be significant ( $b = 1.39, p < .001$ ). Then, a partially mediated model adding the mediating paths metacognition and emotion regulation suppression to the direct path from the predictor to the criterion was assessed. The results indicated this model was a good fit to the data:  $\chi^2 (2393, N = 574) = 4808, p < .001$ ; RMSEA = .04 (90% CI = .040 - .044); CFI = .88 and TLI = .87. And last, a fully mediated model was tested. In this model the direct path coefficient between physical childhood maltreatment and BPD traits was constrained. The results indicated this model was also a good fit to the data:  $\chi^2 (2394, N = 574) = 4813, p < .001$ ; RMSEA = .04 (90% CI = .040 - .044); CFI = .88 and TLI = .87. After testing for difference in model fit between the fully mediated model and the partially mediated model using the difftest, the comparison was statistically significant [9.310 (1),  $p = .002$ ] indicating that the least constrained model, the partially mediated model (see Figure 23), had to be acknowledged as the model that best fit the data (see Table 40 for full model information).



**Figure 23. Partially Mediated Model for Sub-Model 5. \*  $p < .002$ .**

In assessing the direct model following Anderson and Gerbing's approach the results indicated this model was a borderline fit to the data:  $\chi^2 (2394, N = 574) = 5298, p < .001$ ; RMSEA = .05 (90% CI = .044 - .048); CFI = .84 and TLI = .84). When the direct model was compared with the partial model for difference in model fit using the difftest, the comparison was statistically significant [161.28 (1),  $p = .000$ ], indicating that the least constrained model of the two, the partially mediated model, had to be acknowledge as the better fit to the data. Similarly, the null model was assessed. The results indicated that the null model was a poor fit to the data:  $\chi^2 (7807, N = 574) = 2398, p < .001$ ; RMSEA = .06 (90% CI = .061 - .064); CFI = .72 and TLI = .71. Given the fact that this model was so poor and did not fit the data, testing for difference in model fit was not necessary. Consequently, the two models that better fit the data in this model, as well as in Holmbeck's approach, were the partially and the fully mediated models. As a result, since a difference in model fit comparison between these two models had already indicated the least constrained model had to be chosen; the partially mediated model was selected as the model that best fit the data (see Table 40).

**Table 40. Sub-Model 5 alternative models**

<i>Model</i>	<i>Overall <math>\chi^2</math></i>	<i>df</i>	<i>RMSEA</i>	<i>CI for RMSEA</i>	<i>CFI</i>	<i>TLI</i>	<i><math>\Delta \chi^2</math> (df)</i>
<i>Saturated</i>	4506.76*	2392	.039	.037 - .041	.890	.886	
<i>Direct</i>	5298.84*	2394	.046	.044 - .048	.849	.844	<sup>(1)</sup> 161.28 (1) <i>p</i> = .000
<i>Partial</i>	4808.25*	2393	.042	.040 - .044	.875	.870	(Model that best fit the data)
<i>Full</i>	4813.33*	2394	.042	.040 - .044	.875	.870	<sup>(2)</sup> 9.310 (1) <i>p</i> = .002
<i>Null</i>	7807.82*	2398	.063	.061 - .064	.720	.709	

*Note.* *N* = 574. RMSEA = root-mean square error of approximation; CFI = comparative fit index; TFI = Tucker Lewis index; Saturated model = all parameters estimated; Direct model = the effects of the predictor on the criterion in the absence of the mediators estimated; Partial model = the direct path from the predictor to the criterion in addition to the mediating paths estimated; Full model = the mediating paths without the direct path from the predictor to the criterion estimated; Null model = all parameters fixed at zero. <sup>(1)</sup> Diff test results comparing the partial model with the direct model (the partial model was a best fit for the data); <sup>(2)</sup> Diff test results comparing the partial model with the full model (*p* = .002) indicating that the partial model was the best fit for the data. \* *ps* < .001.

A SEM analysis of the data using the fully mediated model to assess for the standardized mediational effects of the mediators indicated that metacognition partially mediated the relationship between physical childhood abuse and BPD traits. Metacognition significantly predicted BPD traits ( $b = 1.8$ ,  $SE = .46$ ,  $\beta = .87$ ,  $p < .001$ ), and it was also found to be significantly related to physical childhood maltreatment ( $b = .42$ ,  $SE = .07$ ,  $\beta = .39$ ,  $p < .001$ ). The indirect effect tested using bootstrapped standard errors (see Table 41) was also significant ( $b = .77$ ,  $SE = .23$ ,  $p < .001$ ).

In addition, the results indicated that emotion regulation suppression partially mediated the relationship between physical childhood abuse and BPD traits as emotion regulation suppression significantly predicted BPD traits ( $b = .73$ ,  $SE = .27$ ,  $\beta = .36$ ,  $p < .007$ ), and was also significantly related to physical childhood

maltreatment ( $b = .49$ ,  $SE = .09$ ,  $\beta = .44$ ,  $p < .000$ ). The indirect effect tested using bootstrapped standard errors (see Table 41) was also significant ( $b = .36$ ,  $SE = .15$ ,  $p < .018$ ). These findings supported the hypothesized mediational model for both metacognition and emotion regulation suppression.

**Table 41.** *Mediation Results (Bootstrapped Effect Sizes) - The effects of Emotion Regulation Suppression and Metacognition as mediators in the Relationship between Physical Childhood Maltreatment and BPD traits*

Indirect Effects				Confidence Intervals		
Mediator	Estimate	S.E.	P-Value	Lower 5%	Estimate	Upper 5%
METACOG	.768	.226	.001	.395	.768	1.14
ERSupp	.358	.151	.018	.109	.358	.607
Total						
Indirect	1.12	.356	.002	.540	1.12	1.71
Effect						

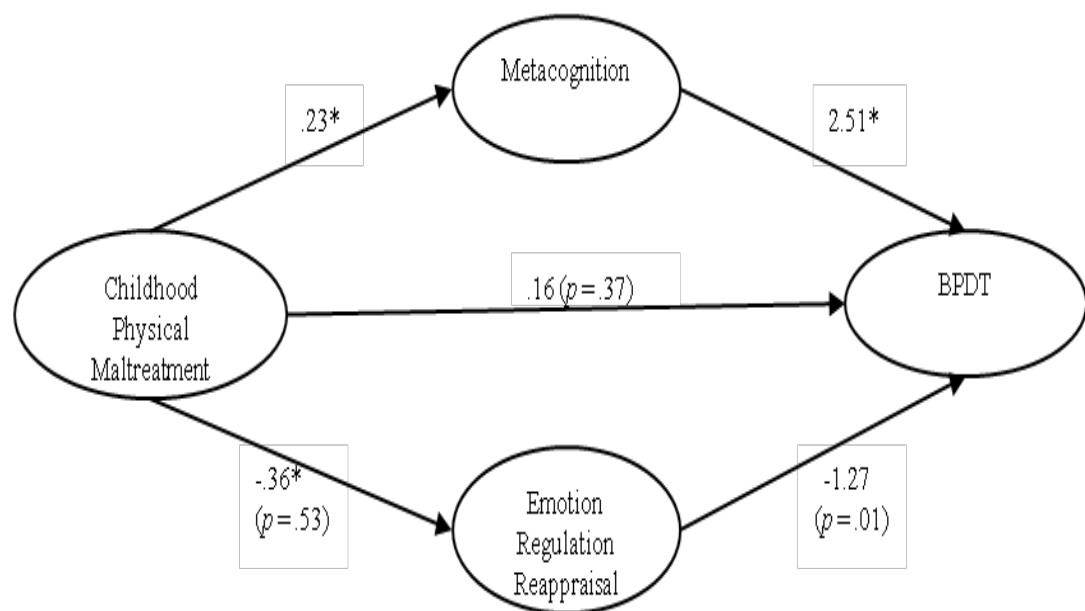
*Note.*  $N = 574$ . METACOG = Metacognition; ERSupp = Emotion Regulation Suppression.

#### 4.3.6 Sub-Model 6

*Metacognition and lack of Emotion Regulation Reappraisal as Mediators in the Relationship between Physical Childhood Maltreatment and Borderline Personality Traits.*

The purpose of this sub-model was to investigate the role of metacognition and the lack of emotion regulation reappraisal as mediators in the relationship between physical childhood maltreatment and Borderline Personality Disorder traits. First, applying Holmbeck's three-step approach, the direct path coefficient from the predictor (physical childhood maltreatment) to the criterion (BPD traits) without the mediating latent variables (metacognition and lack of emotion regulation reappraisal)

was measured. The results corroborated the results from the previous sub-model as the direct relationship between physical childhood maltreatment and BPD traits was found to be significant ( $b = 1.54, p < .001$ ). Then, a partially mediated model adding the mediating paths metacognition and lack of emotion regulation reappraisal to the direct path from the predictor to the criterion was tested. The results indicated a good fit to the data:  $\chi^2 (2463, N = 574) = 4434, p < .001$ ; RMSEA = .04 (90% CI = .036 - .039); CFI = .90 and TLI = .90. However, the individual parameter in this model indicated that the relationship between physical childhood maltreatment and the lack of emotion regulation reappraisal ( $b = -.36, p = .53$ ; see Figure 24) was not significant. According to Holmbeck's proposed guidelines for model assessment, the obtained results suggested that the lack of emotion regulation reappraisal did not mediate the relationship between physical childhood maltreatment and BPD traits. Taking into consideration that the role of metacognition in the relationship between physical childhood maltreatment and BPD traits had already been investigated in the previous sub-model, there was no need to continue to work with this sub-model.



**Figure 24. The Partially Mediated Model for sub-model 6.  $*(p < .006)$ .**

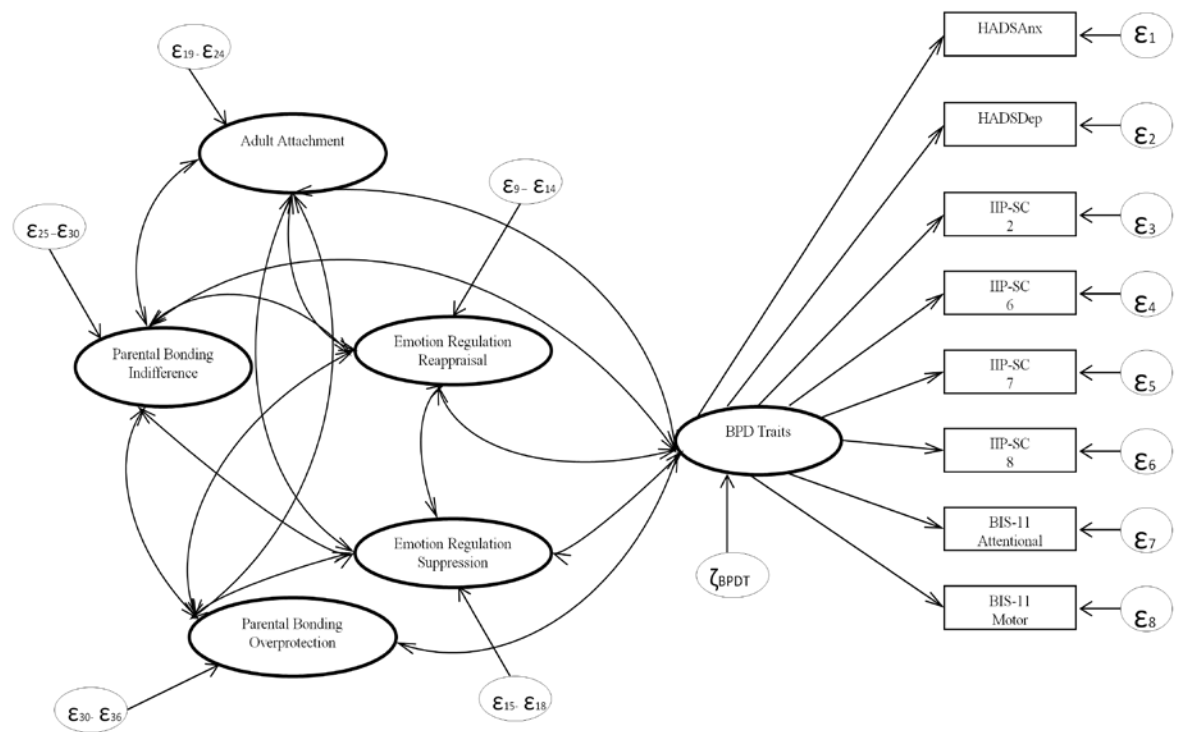
#### 4.4 Model III: Parental Bonding-Adult Attachment-Emotion Regulation-Borderline Personality Traits

The third model consisted of six first order latent constructs that defined the areas of interest for this research and accounted for the relationship between parental bonding and traits associated with BPD, and also for the relationship between adult insecure attachment and BPD associated features with emotion regulation suppression and the lack of emotion regulation reappraisal as proposed mediators in both relationships (see Figure 25, Figure 26, and Figure 27). This model also consisted of eight second order factors that accounted for the latent construct BPD traits. The results of the CFA for the revised model indicated that this model was a good fit to the data:  $\chi^2$  (2526,  $N = 574$ ) = 5039,  $p < .001$ ; RMSEA = .04 (90% CI = .040 - .043); CFI = .87 and TLI = .87 (see Table 42).

**Table 42.** *General Model III*

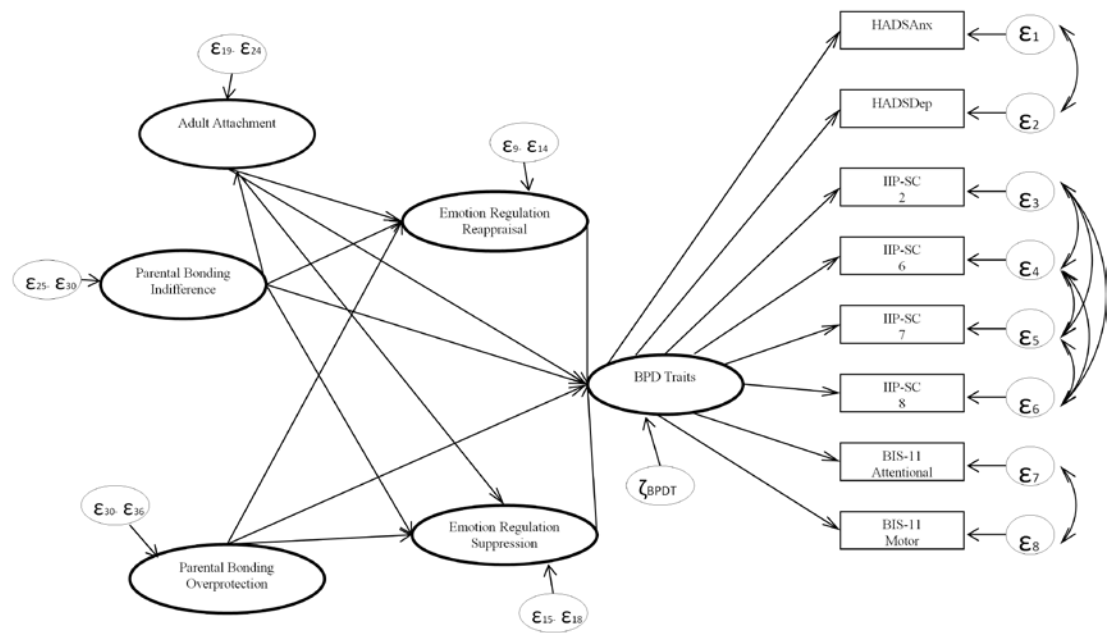
<i>Model</i>	<i>Overall <math>\chi^2</math></i>	<i>df</i>	<i>RMSEA</i>	<i>CI for RMSEA</i>	<i>CFI</i>	<i>TLI</i>
<i>Measurement Model</i>						
<i>(Saturated)</i>	5796.56*	2532	.047	.046 - .049	.836	.830
<i>Revised Model</i>	5039.55*	2526	.042	.040 - .043	.874	.869
<i>Structural Model</i>	5041.22*	2527	.042	.040 - .043	.874	.869

*Note.*  $N = 574$ . RMSEA = root-mean square error of approximation; CFI = comparative fit index; TFI = Tucker Lewis index. \*  $p < .001$ .



**Figure 25. Model III: Confirmatory Factor Analysis with saturated covariances among factors (Measurement Model) for the hypothesized relationship between parental bonding and BPD traits and also the hypothesized relationship between adult attachment and BPD traits mediated by emotion regulation suppression and lack of emotion regulation reappraisal.**

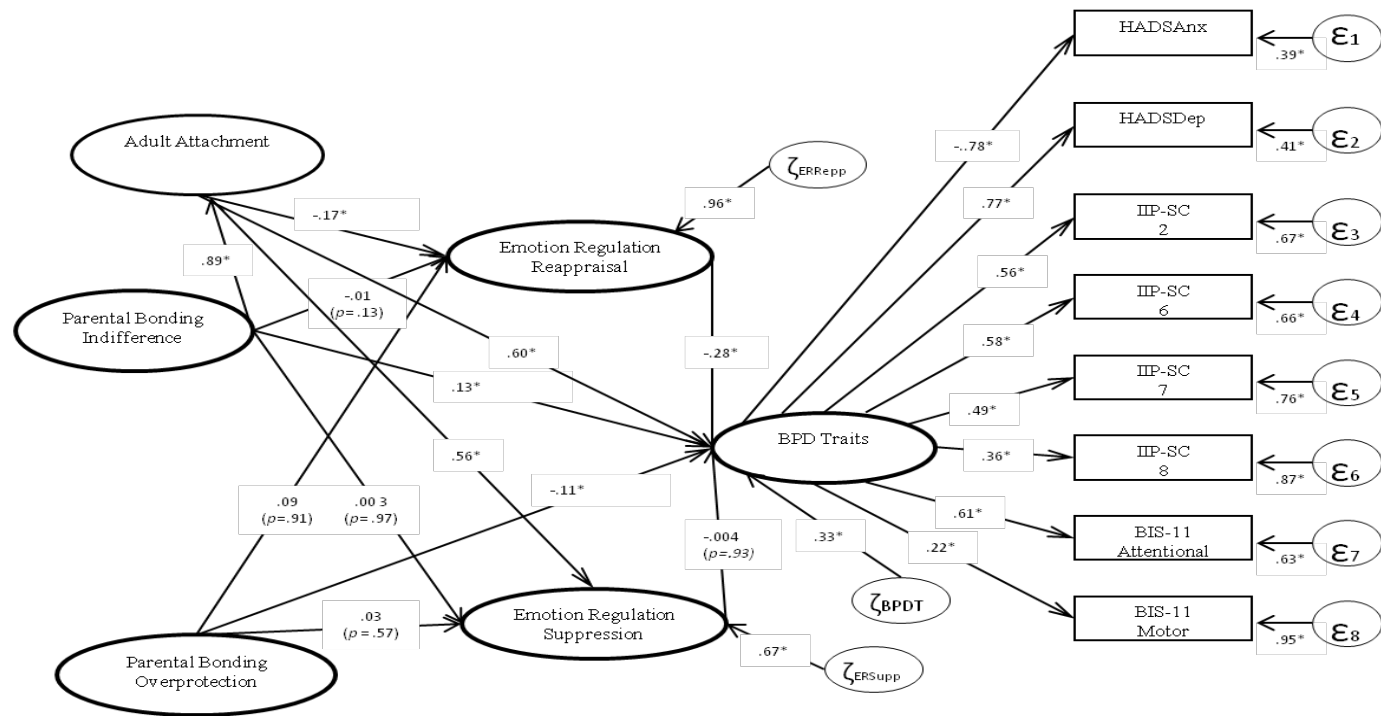
*Measurement Model (Model II, N = 574).* The ovals represent the first order latent constructs, and the boxes are used to represent the second order latent constructs; One-headed arrows represent regression relationships, while two-headed arrows represent correlational relationships; *BPD* = *Borderline Personality Disorder* traits; *HADSAnx* = *anxiety sub-scale from the HADS*; *HADSDep* = *depression sub-scale from the HADS*; *IIP-SC 2* = *vindictive/self-centered sub-scale from the IIP-SC*; *IIP-SC 6* = *overly accommodating sub-scale from the IIP-SC*; *IIP-SC 7* = *self-sacrificing sub-scale from the IIP-SC*; *IIP-SC 8* = *intrusive/needy sub-scale from the IIP-SC*; *BIS-11 attentional* = *attentional impulsiveness sub-scale from the BIS-11*; *motor* = *motor impulsiveness sub-scale from the BIS-11*.



**Figure 26. Model III: Revised Model for the hypothesized relationship between parental bonding and BPD traits and also the hypothesized relationship between adult attachment and BPD traits mediated by emotion regulation suppression and lack of emotion regulation reappraisal.**

*Revised Model (Model III,  $N = 574$ ).* The ovals represent the first order latent constructs, and the boxes are used to represent the second order latent constructs; One-headed arrows represent regression relationships, while two-headed arrows represent correlational relationships; *BPD* = *Borderline Personality Disorder traits*; *HADSAnx* = *anxiety sub-scale from the HADS*; *HADSDep* = *depression sub-scale from the HADS*; *IIP-SC 2* = *vindictive/self-centered sub-scale from the IIP-SC*; *IIP-SC 6* = *overly accommodating sub-scale from the IIP-SC*; *IIP-SC 7* = *self-sacrificing sub-scale from the IIP-SC*; *IIP-SC 8* = *intrusive/needy sub-scale from the IIP-SC*; *BIS-11 attentional* = *attentional impulsiveness sub-scale from the BIS-11*; *motor* = *motor impulsiveness sub-scale from the BIS-11*.





**Figure 27. Model III: Structural Model for the hypothesized relationship between parental bonding and BPD traits and also the hypothesized relationship between adult attachment and BPD traits mediated by emotion regulation suppression and lack of emotion regulation reappraisal.**

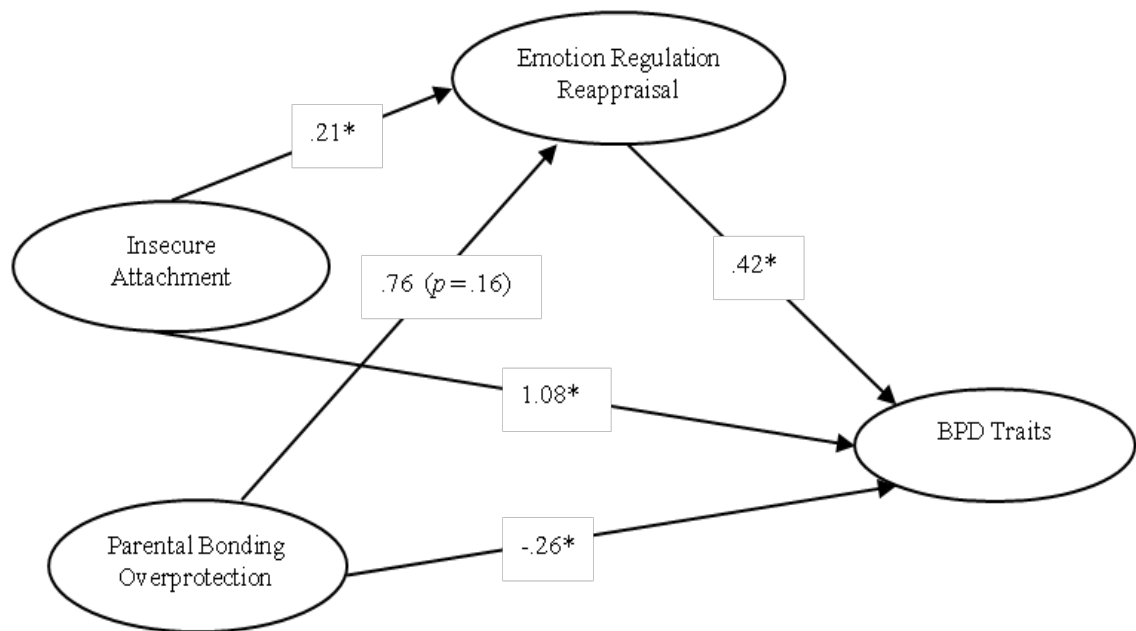
*Measurement Model (Model I, N = 574).* The ovals represent the first order latent constructs, and the boxes are used to represent the second order latent constructs; One-headed arrows represent regression relationships, while two-headed arrows represent correlational relationships; *BPD* = *Borderline Personality Disorder* traits; *HADSAnx* = anxiety sub-scale from the *HADS*; *HADSDep* = depression sub-scale from the *HADS*; *IIP-SC 2* = vindictive/self-centered sub-scale from the *IIP-SC*; *IIP-SC 6* = overly accommodating sub-scale from the *IIP-SC*; *IIP-SC 7* = self-sacrificing sub-scale from the *IIP-SC*; *IIP-SC 8* = intrusive/needy sub-scale from the *IIP-SC*; *BIS-11 attentional* = attentional impulsiveness sub-scale from the *BIS-11*; *motor* = motor impulsiveness sub-scale from the *BIS-11*.

#### 4.4.1 Sub-Model 7

*The Role of lack of Emotion Regulation Reappraisal as a Mediator in the Relationship between Parental Bonding Overprotection and Borderline Personality Traits, and in the Relationship between Insecure Attachment, and Borderline Personality Traits.*

The purpose of this sub-model was to investigate whether the lack of emotion regulation reappraisal mediated the relationship between parental bonding overprotection, insecure attachment and BPD traits. The structural model was analyzed following Holmbeck's three-step approach. First, the direct path coefficients from the predictors (parental bonding overprotection and attachment) to the criterion (BPD traits) without the mediating latent variable (lack of emotion regulation reappraisal) were measured. The results found the direct relationship between attachment and BPD traits significant ( $b = 1.36, p < .001$ ). The direct relationship between parental bonding overprotection and BPD traits was also found to be significant ( $b = -.257, p < .003$ ). Then, a partially mediated model (Model A) adding the mediating paths from insecure attachment to BPD traits via lack of emotion regulation reappraisal and from parental bonding overprotection to BPD traits via lack of emotion regulation reappraisal to the direct paths from insecure attachment and parental bonding overprotection to the criterion was assessed. The results indicated this model was a good fit to the data:  $\chi^2(1870, N = 574) = 3922, p < .001$ ; RMSEA = .04 (90% CI = .042 - .046); CFI = .88 and TLI = .88. Nevertheless, on inspecting this model further, the individual path relationship between parental bonding overprotection and lack of emotion regulation reappraisal ( $b = -.76, p = .16$ ), was not significant (see Figure 28). Although this relationship did not meet Holmbeck's minimal standards for mediation (consequently no further work involving this relationship was needed) the decision to continue with Holmbeck's three-step process was made. The main purpose for this was to further investigate the relationship between parental bonding indifference and BPD traits as a way to corroborate Holmbeck's recommendations. Hence, a fully mediated model (Model B) constraining both direct path coefficients from insecure attachment and parental bonding overprotection to BPD traits was tested. The results indicated this model

was a mediocre fit to the data:  $\chi^2 (1872, N = 574) = 4733, p < .001$ ; RMSEA = .05 (90% CI = .050 - .054); CFI = .83 and TLI = .83. After testing for difference in model fit between Model A and Model B using the difftest, the comparison was statistically significant [228.36 (2),  $p < .001$ ], indicating that the least constrained model (Model A-the partially mediated model-see Figure 28) had to be acknowledge as the model that best fit the data (see Table 43 for full model information).



**Figure 28. Model A-General Model III-Sub-Model 7. \* $p < .003$ .**

Using Anderson and Gerbing's approach, a model partially mediated for insecure attachment and fully mediated for parental bonding overprotection (Model C) was assessed. The results indicated this model was a partial fit to the data:  $\chi^2 (1871, N = 574) = 3937, p < .001$ ; RMSEA = .04 (90% CI = .042 - .046); CFI = .88 and TLI = .88 (see Table 43). Yet, when compared with Model A (the partially mediated model for both predictors) for difference in model fit using the difftest, the comparison was statistically significant [11.48 (1),  $p < .001$ ], indicating that the least constrained model (Model A) had to be acknowledged to be a better fit to the data. After that, a partially mediated model for parental bonding overprotection and fully mediated for insecure attachment (Model D) was assessed. The results indicated this model was

also a mediocre fit to the data:  $\chi^2(1871, N = 574) = 4340, p < .001$ ; RMSEA = .05 (90% CI = .046 - .050); CFI = .86 and TLI = .85. After testing for difference in model fit, the comparison between Model A and Model D was significant [100.53 (1),  $p < .001$ ], indicating that the least constrained model of the two (Model A) was a better fit to the data. In consequence, Model A was selected over all other models as it was the model that best fit the data using both Holmbeck's process and Anderson and Gerbing's approach.

A SEM analysis of the data using Model A to assess for the standardized mediational effects of the mediator on both predictors indicated that the lack of emotion regulation reappraisal partially mediated the relationship between insecure attachment and BPD traits. Specifically, lack of emotion regulation reappraisal significantly predicted BPD traits ( $b = -.42, SE = .07, \beta = .26, p < .001$ ), and was also significantly related to insecure attachment ( $b = -.21, SE = .05, \beta = -.20, p < .001$ ). In addition, the indirect effect tested using bootstrapped standard errors (see Table 44) was also significant ( $b = .09, SE = .03, p < .006$ ). Contrary to what was hypothesized however, the results indicated that the relationship between lack of emotion regulation reappraisal and parental bonding overprotection was not significant ( $b = .075, SE = .05, \beta = .07, p = .16$ ). Also, regarding this relationship, it is important to note that Holmeck's statistical assumptions held true, and the continued work on the relationship involving parental bonding overprotection could have safely been terminated as soon as the relationship between parental bonding overprotection and lack of emotion regulation reappraisal was found to be not significant.

**Table 43.** *Sub-Model 7 alternative models*

<i>Model</i>	<i>Overall <math>\chi^2</math></i>	<i>df</i>	<i>RMSEA</i>	<i>CI for RMSEA</i>	<i>CFI</i>	<i>TLI</i>	<i><math>\Delta \chi^2</math> (df)</i>
<i>Saturated</i>	3922.69*	1870	.044	.042 - .046	.881	.876	
<i>Model A</i>	3922.69*	1870	.044	.042 - .046	.881	.876	( <i>Model that best fit the data</i> )
<i>Model B</i>	4733.78*	1872	.052	.050 - .054	.834	.827	<sup>(1)</sup> 228.36 (2) <i>p</i> = .000
<i>Model C</i>	3937.99*	1871	.044	.042 - .046	.880	.875	<sup>(2)</sup> 11.48 (1) <i>p</i> = .001
<i>Model D</i>	4340.05*	1871	.048	.046 - .050	.857	.851	<sup>(3)</sup> 100.53 (1) <i>p</i> = .000

*Note.* *N* = 574. RMSEA = root-mean square error of approximation; CFI = comparative fit index; TFI = Tucker Lewis index; Saturated model = all parameters estimated; Model A = the direct path from both predictors to the criterion in addition to their mediating paths estimated (same as the partially mediated model); Model B = the mediating paths without the direct paths from the predictors to the criterion estimated (same as the fully mediated model); Model C = partial mediation for insecure attachment and full mediation for parental bonding overprotection estimated; Model D = partial mediation for parental bonding overprotection and full mediation for insecure attachment estimated.

<sup>(1)</sup> Difftest results comparing Model A with Model B (Model A was a better fit to the data); <sup>(2)</sup> Difftest results comparing Model A with Model C (Model A was a better fit to the data); <sup>(3)</sup> Difftest results comparing Model A with Model D (*p* = .000) indicating that Model A was a better fit to the data. \* *ps* < .001.

**Table 44.** *Mediation Results (Bootstrapped Effect Sizes) - The effects of lack of emotion regulation reappraisal as a mediator in the relationship between parental bonding overprotection and BPD traits, and in the relationship between insecure attachment and BPD traits.*

Indirect Effects				Confidence Intervals		
Mediator	Estimate	S.E.	P-Value	Lower 5%	Estimate	Upper 5%
ERRepp						
Attach →	.087	.032	.006	.032	.081	.130
BPDT						
Total Indirect Effect	.087	.032	.006	.175	.406	.637
ERRepp						
PBIo →	-.032	.028	.260 (NS)			
BPDT						
Total Indirect Effect	-.032	.028	.260 (NS)			

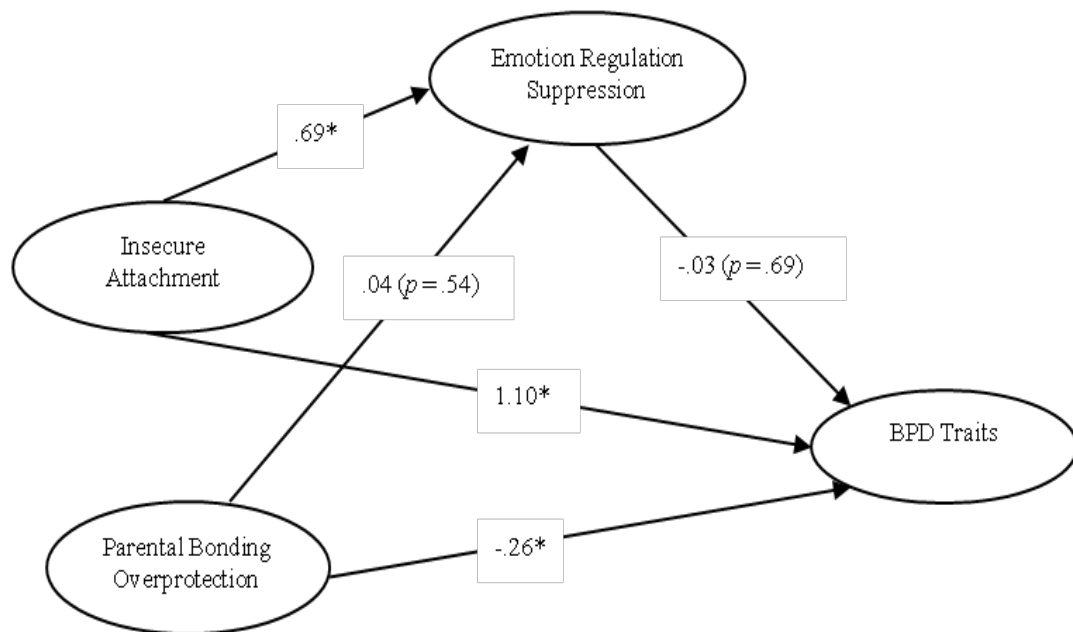
*Note.*  $N = 574$ . ERRepp = Lack of Emotion Regulation Reappraisal (proposed mediator); Attach = Insecure Attachment; BPDT = Borderline Personality Traits; PBIo = Parental Bonding Overprotection.

#### 4.4.2 Sub-Model 8

*The Role of Emotion Regulation Suppression as a Mediator in the Relationship between Parental Bonding Overprotection and Borderline Personality Traits, and in the Relationship between Insecure Attachment and Borderline Personality Traits.*

The purpose of this sub-model was to investigate whether emotion regulation suppression mediated the relationship between parental bonding overprotection, and BPD traits, and also the relationship between insecure attachment and BPD traits. The structural model was analyzed following Holmbeck's three-step approach by measuring direct path coefficients from the predictors (parental bonding overprotection and insecure attachment) to the criterion (BPD traits) without the mediating latent variable (emotion regulation suppression). The results found the

direct relationship between insecure attachment and BPD traits significant ( $b = 1.07$ ,  $p < .001$ ). The direct relationship between parental bonding overprotection and BPD traits was also found to be significant ( $b = -.266$ ,  $p < .001$ ). After that, a partially mediated model adding the mediating paths from insecure attachment to BPD traits via emotion regulation suppression and from parental bonding overprotection to BPD traits via emotion regulation suppression to the direct paths from insecure attachment and parental bonding overprotection to the criterion was assessed. The results indicated this model was a good fit to the data:  $\chi^2(1809, N = 574) = 4087$ ,  $p < .001$ ; RMSEA = .05 (90% CI = .045 - .049); CFI = .87 and TLI = .86. However, on further inspection, the individual path relationship between parental bonding overprotection and emotion regulation suppression ( $b = -.04$ ,  $SE = .06$ ,  $p = .536$ ), and the relationship between BPD traits and emotion regulation suppression ( $b = -.03$ ,  $SE = .07$ ,  $p = .685$ ) were not significant (see Figure 29). Consequently, because of the presenting situation, all work related to this sub-model was concluded.



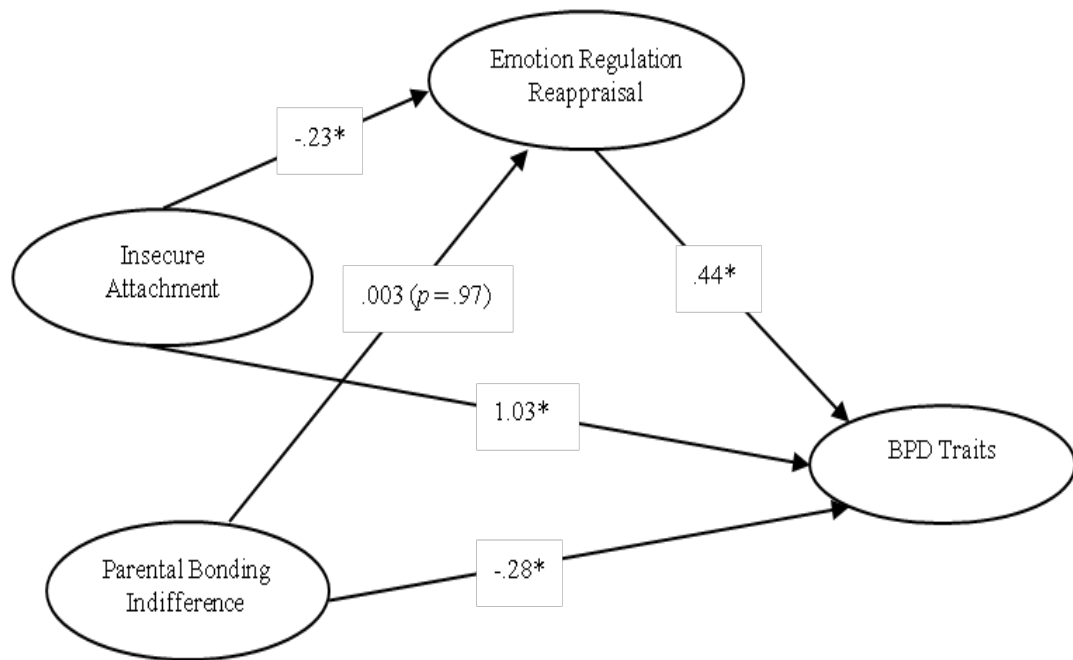
**Figure 29. Model B-General Model III-Sub-Model 8. \*  $p < .001$ .**

#### 4.4.3 Sub-Model 9

*The Role of lack of Emotion Regulation Reappraisal as a Mediator in the Relationship between Parental Bonding Indifference and Borderline Personality Traits, and in the Relationship between Insecure Attachment, and Borderline Personality Traits.*

The purpose of this sub-model was to investigate whether lack of emotion regulation reappraisal mediated the relationship between parental bonding indifference, insecure attachment and BPD traits. Three structural models were assessed following Holmbeck's three-step approach. First, the direct path coefficients from the predictors (parental bonding indifference and insecure attachment) to the criterion (BPD traits) without the mediating latent variable (lack of emotion regulation reappraisal) were measured. The results found the direct relationship between insecure attachment and BPD traits significant ( $b = 1.09, p < .001$ ). The direct relationship between parental bonding indifference and BPD traits was also significant ( $b = -.256, p < .001$ ). After that, a partially mediated model adding the mediating paths from insecure attachment to BPD traits via lack of emotion regulation reappraisal and from parental bonding indifference to BPD traits via lack of emotion regulation reappraisal to the direct paths from insecure attachment and parental bonding indifference to the criterion was assessed. The results indicated a partial fit to the data:  $\chi^2(1809, N = 574) = 3863, p < .001$ ; RMSEA = .04 (90% CI = .042 - .046); CFI = .88 and TLI = .88. However, the path from parental bonding indifference to emotion regulation reappraisal ( $b = .003, p = .97$ ) was not significant (see Figure 30). Since, according to the results, the relationship between parental bonding indifference and BPD traits was not mediated by the lack of emotion regulation reappraisal, the work relating to this relationship was concluded and the sub-model was adjusted appropriately.

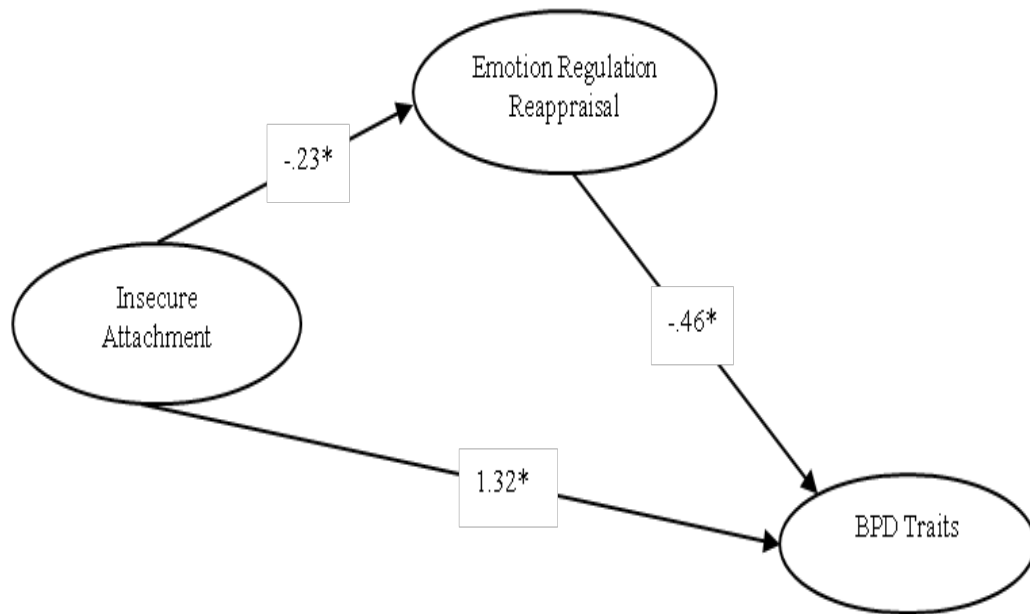




**Figure 30. Model A-General Model III-Sub-Model 9. \*  $p < .002$ .**

The general model was modified to further investigate the relationship between insecure attachment and BPD traits mediated by the lack of emotion regulation reappraisal only. Thus, a modified sub-model that excluded criterion variable parental bonding indifference (see Figure 31) was assessed. It is important to note that, for all intents and purposes, Holmbeck's three-step approach continued to be used as suggested. Therefore, the partially mediated model (Model A) adding the mediating path from attachment to BPD traits via lack of emotion regulation reappraisal to the existing direct path from insecure attachment to the criterion was tested. The removal of parental bonding indifference had virtually no effect on the fit of the model, the results indicated the new model was still a good fit to the data as before:  $\chi^2(1811, N = 574) = 3865, p < .001$ ; RMSEA = .04 (90% CI = .043 - .046); CFI = .88 and TLI = .88 (see Table 45 for complete data information). In addition, all paths relating to this relationship were significant. Continuing with Holmbeck's approach, a fully mediated model (Model B) constraining both direct path coefficients between BPD traits and the predictors was tested. The results indicated this model was a mediocre fit to the data:  $\chi^2(1811, N = 574) = 4749, p < .001$ ; RMSEA = .05 (90% CI = .051 - .055); CFI = .83 and TLI = .83. When Model B was

compared with Model A (the partially mediated model) for difference in model fit, the comparison was significant [246.46 (2),  $p < .001$ ], indicating that the least constrained model of the two (Model A) had to be acknowledge as the better fit to the data. Due to the forced modification of this model, the Anderson and Gerbing approach adopted for this sub-model was the same approach as that used with all the sub-models in general model I in which a direct and a null alternative models were used; however, the labelling of the models using capital letters was not changed.



**Figure 31. Modified Model A-General Model III-Sub-Model 9. \* $p < .001$ .**

Under Anderson and Gerbing's approach a direct model (Model C) and a null model (Model D) were assessed. The testing results for the alternative Model C indicated this model was a good fit to the data:  $\chi^2(1810, N = 574) = 3877$ ,  $p < .001$ ; RMSEA = .05 (90% CI = .043 - .047); CFI = .88 and TLI = .88. Yet, when compared with Model A for difference in model fit using the diff test, the comparison was statistically significant [11.17 (1),  $p < .008$ ], indicating that the least constrained model (Model A) still had to be acknowledged as the model that best fit the data. After that, the null model, Model D, was assessed:  $\chi^2(1810, N = 574) = 4132$ ,  $p < .001$ ; RMSEA = .05 (90% CI = .045 - .049); CFI = .87 and TLI = .86. These results indicated that Model D was still a good fit to the data. Although, when compared

with Model A for difference in model fit, the comparison between both models was statistically significant [96.94 (1),  $p < .001$ ], indicating that the least constrained model (Model A) had to be kept as the model that best fit the data. Consequently, the model that best fitting model following Anderson and Gerbin's approach, as well as following Holmbeck's approach, was the partially mediated model or Model A (see Table 45); thus, this model was selected as the model that best fit the data.

**Table 45.** *Sub-Model 9 (modified) alternative models*

<i>Model</i>	<i>Overall <math>\chi^2</math></i>	<i>df</i>	<i>RMSEA</i>	<i>CI for RMSEA</i>	<i>CFI</i>	<i>TLI</i>	<i><math>\Delta \chi^2</math> (df)</i>
<i>Saturated</i>	3863.96*	1809	.044	.042 - .046	.884	.879	
<i>Model A</i>	3865.79*	1811	.044	.043 - .046	.884	.879	(Model that best fit the data)
<i>Model B</i>	4749.86*	1811	.053	.051 - .055	.834	.827	<sup>(1)</sup> 246.46 (2) $p=.000$
<i>Model C</i>	3877.83*	1810	.045	.043 - .047	.883	.878	<sup>(2)</sup> 11.17 (1) $p=.008$
<i>Model D</i>	4132.20*	1810	.047	.045 - .049	.869	.863	<sup>(3)</sup> 96.94 (1) $p=.000$

*Note.*  $N = 574$ . RMSEA = root-mean square error of approximation; CFI = comparative fit index; TFI = Tucker Lewis index; Saturated model = all parameters estimated; Model A = the direct path from both predictors to the criterion in addition to their mediating paths estimated (same as the partially mediated model); Model B= the mediating paths without the direct paths from the predictors to the criterion estimated (same as the fully mediated model); Model C= the effects of the predictor insecure attachment on the criterion BPD traits in the absence of the mediator estimated (same as the direct model); Model D= all parameters fixed at zero (same as the null model). <sup>(1)</sup> Difftest results comparing Model A with Model B (Model A was the better fit to the data); <sup>(2)</sup> Difftest results comparing Model A with Model C (Model A was a better fit to the data); <sup>(3)</sup> Difftest results comparing Model A with Model D (Model A was a better fit to the data). \*  $ps < .001$ .

A SEM analysis of the data using Model A to assess for standardized mediational effects suggested that lack of emotion regulation reappraisal partially mediated the relationship between insecure attachment and BPD traits. Specifically, lack of emotion regulation reappraisal significantly predicted BPD traits ( $b = -.44$ ,  $SE = .09$ ,  $\beta = -.27$ ,  $p < .008$ ), and was also found to be significantly related to insecure attachment ( $b = -.23$ ,  $SE = .08$ ,  $\beta = -.22$ ,  $p < .002$ ). The indirect effect tested using bootstrapped standard errors (see Table 46) was also significant ( $b = .10$ ,  $SE = .03$ ,  $p < .003$ ). Even with the modifications to the original sub-model, these findings partially supported the initially hypothesized mediational model.

**Table 46.** *Mediation Results (Bootstrapped Effect Sizes) - The Effects of lack of emotion regulation reappraisal as a mediator in the relationship between insecure attachment and BPD traits.*

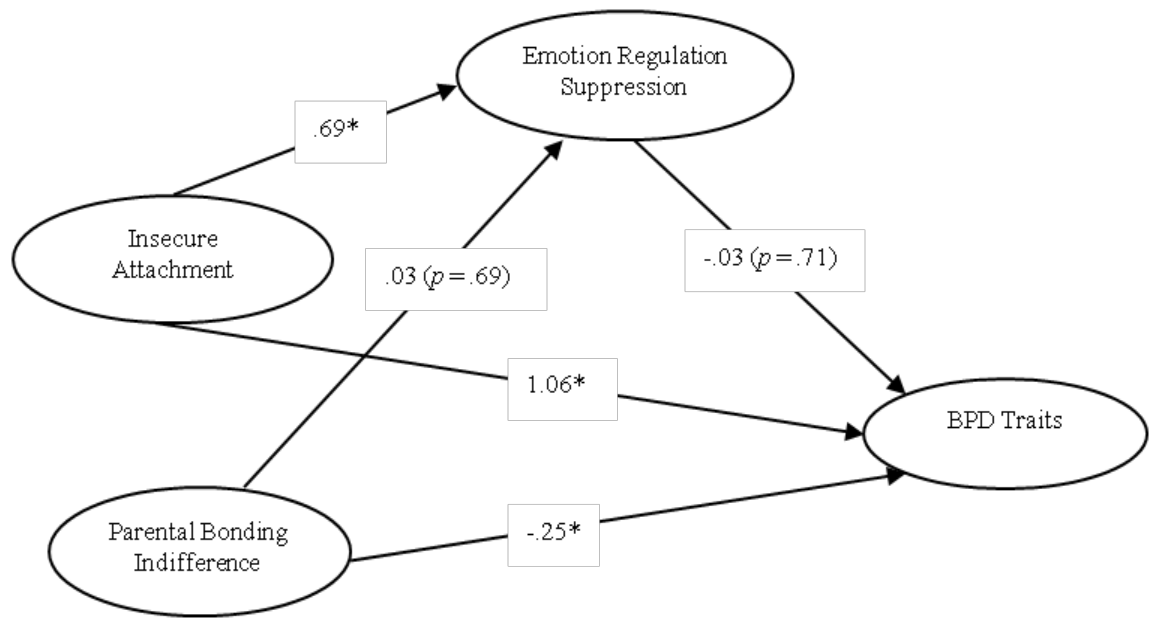
Indirect Effects				Confidence Intervals		
Mediator	Estimate	S.E.	P-Value	Lower 5%	Estimate	Upper 5%
ERRepp Attach → BPDT	.101	.034	.003	.045	.101	.158
Total Indirect Effect	1.130	.119	.000	.934	1.130	1.32

*Note.*  $N = 574$ . ERRepp = Lack of Emotion Regulation Reappraisal (proposed mediator); Attach = Insecure Attachment; BPDT = Borderline Personality Traits.

#### 4.4.4 Sub-Model 10

*The Role of Emotion Regulation Suppression as a Mediator in the Relationship between Parental Bonding Indifference and Borderline Personality Traits, and in the Relationship between Insecure Attachment, and Borderline Personality Traits.*

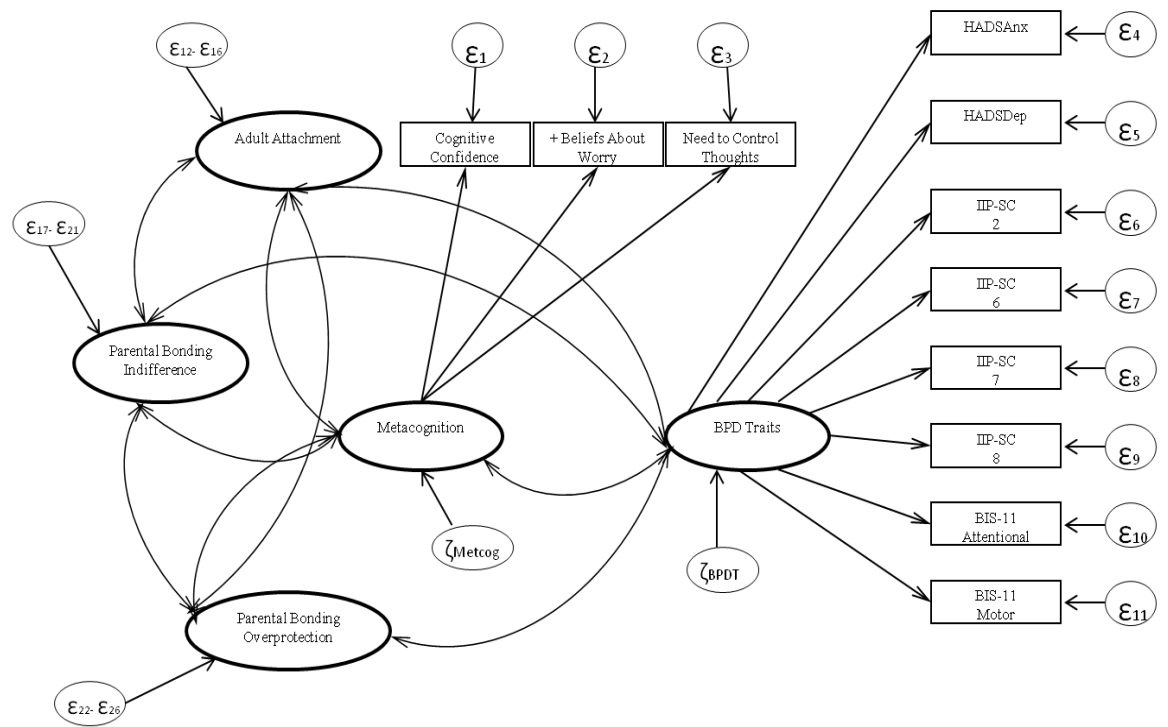
The purpose of this sub-model was to investigate whether emotion regulation suppression mediated the relationship between parental bonding indifference, insecure attachment and BPD traits. In line with the first step of Holmbeck's three-step approach, direct path coefficients from the predictors (parental bonding indifference and attachment) to the criterion (BPD traits) without the mediating latent variable (emotion regulation suppression) were measured. The results found that the direct relationship between insecure attachment and BPD was statistically significant ( $b = 1.02, p < .001$ ). The direct relationship between parental bonding indifference and BPD traits was also significant ( $b = -0.262, p < .001$ ). After that, a partially mediated model adding the mediating paths from insecure attachment to BPD traits via emotion regulation suppression and from parental bonding indifference to BPD traits via emotion regulation suppression to the direct paths from insecure attachment and parental bonding indifference to the criterion was assessed. The results indicated a borderline fit to the data:  $\chi^2(1749, N = 574) = 4047, p < .001$ ; RMSEA = .05 (90% CI = .046 - .050); CFI = .87 and TLI = .86; however, the path from parental bonding indifference to emotion regulation suppression ( $b = .03, p = .69$ ), and the path from emotion regulation suppression to BPD traits ( $b = -.03, p = .71$ ) were not significant (see Figure 32). According to these results, the relationship between parental bonding indifference and BPD traits was not mediated by emotion regulation suppression. In addition, the relationship between insecure attachment and BPD traits was not mediated by emotion regulation suppression either. Consequently, the work involving both relationships in this model was terminated.



**Figure 32. Model A-General Model III-Sub-Model 10. \*  $p < .001$ .**

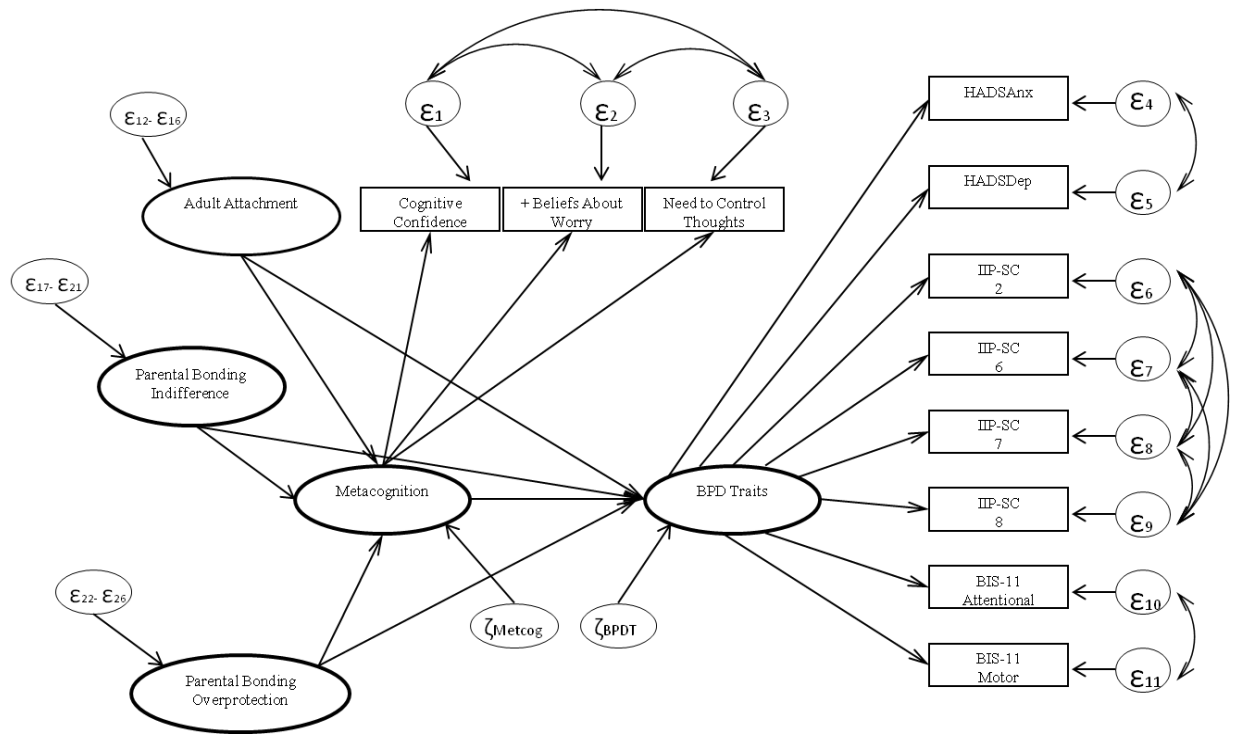
#### **4.5 Model IV: Parental Bonding-Adult Attachment-Metacognition-Borderline Personality Traits**

The fourth and last model consisted of six first order latent constructs that defined the areas of interest for this research and accounted for the relationship between parental bonding and traits associated with BPD, and also for the relationship between adult insecure attachment and BPD associated features, with metacognition as the proposed mediator in both relationships (see Figure 33, Figure 34, and Figure 35). This model also consisted of eight second order factors that accounted for the latent construct BPD traits and three other second order factors that accounted for the metacognition construct. The results of the CFA for the revised model indicated that this model was a good fit to the data:  $\chi^2(3132, N = 574) = 5261, p < .001$ ; RMSEA = .03 (90% CI = .033 - .036); CFI = .90 and TLI = .90 (see Table 47).



**Figure 33. Model IV: Confirmatory Factor Analysis with saturated covariances among factors (Measurement Model) for the hypothesized relationship between parental bonding and BPD traits and also the hypothesized relationship between adult attachment and BPD traits mediated by metacognition.**

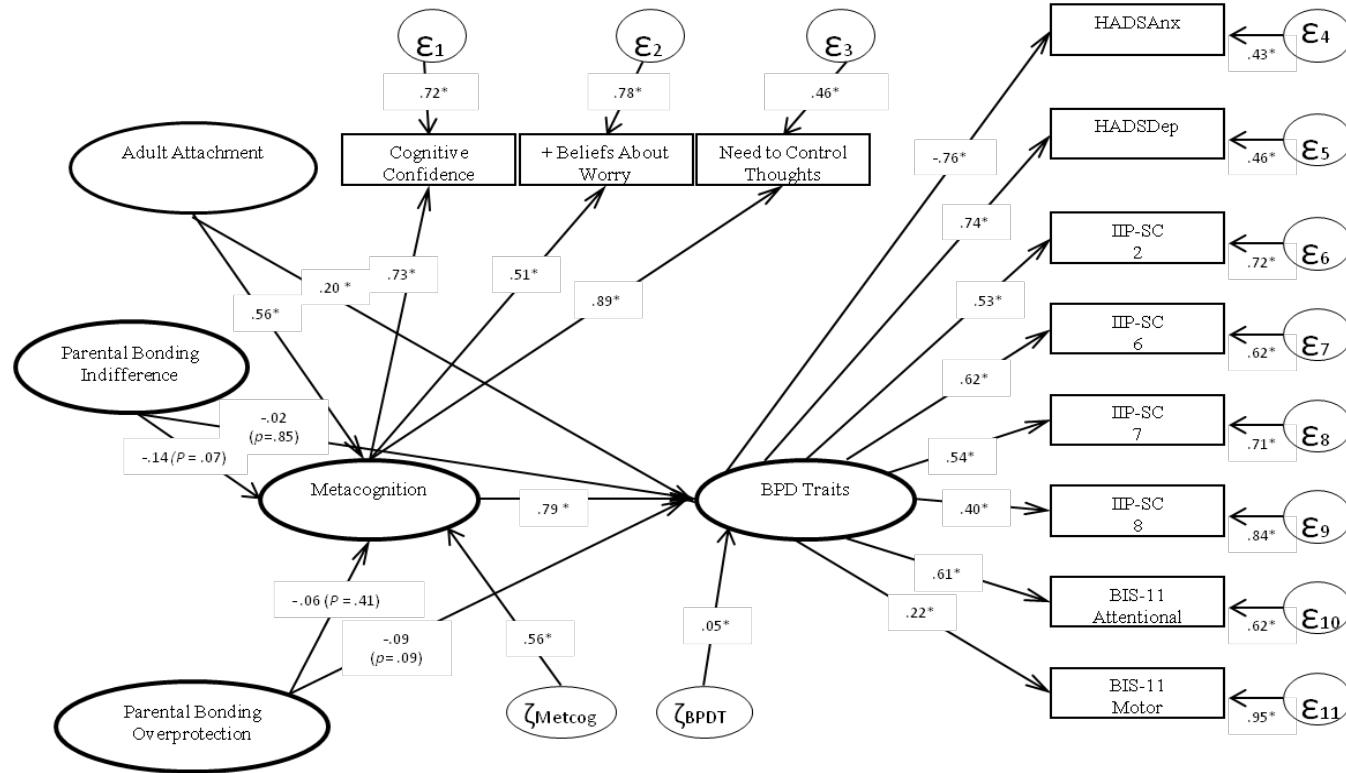
*Measurement Model (Model II,  $N = 574$ ). The ovals represent the first order latent constructs, and the boxes are used to represent the second order latent constructs; One-headed arrows represent regression relationships, while two-headed arrows represent correlational relationships; *BPDT* = *Borderline Personality Disorder traits*; *HADSAnx* = *anxiety sub-scale from the HADS*; *HADSDep* = *depression sub-scale from the HADS*; *IIP-SC 2* = *vindictive/self-centered sub-scale from the IIP-SC*; *IIP-SC 6* = *overly accommodating sub-scale from the IIP-SC*; *IIP-SC 7* = *self-sacrificing sub-scale from the IIP-SC*; *IIP-SC 8* = *intrusive/needy sub-scale from the IIP-SC*; *BIS-11 attentional* = *attentional impulsiveness sub-scale from the BIS-11*; *motor* = *motor impulsiveness sub-scale from the BIS-11*.*



**Figure 34. Model IV: Revised Model for the hypothesized relationship between parental bonding and BPD traits and also the hypothesized relationship between adult attachment and BPD traits mediated by metacognition.**

*Revised Model (Model VI,  $N = 574$ ). The ovals represent the first order latent constructs, and the boxes are used to represent the second order latent constructs; One-headed arrows represent regression relationships, while two-headed arrows represent correlational relationships; *BPD* = *Borderline Personality Disorder* traits; *HADSAnx* = *anxiety* sub-scale from the *HADS*; *HADSDep* = *depression* sub-scale from the *HADS*; *IIP-SC 2* = *vindictive/self-centered* sub-scale from the *IIP-SC*; *IIP-SC 6* = *overly accommodating* sub-scale from the *IIP-SC*; *IIP-SC 7* = *self-sacrificing* sub-scale from the *IIP-SC*; *IIP-SC 8* = *intrusive/needy* sub-scale from the *IIP-SC*; *BIS-11 attentional* = *attentional impulsiveness* sub-scale from the *BIS-11*; *motor* = *motor impulsiveness* sub-scale from the *BIS-11*.*





**Figure 35. Model IV: Structural Model for the hypothesized relationship between parental bonding and BPD traits and also the hypothesized relationship between adult attachment and BPD traits mediated by metacognition.**

*Measurement Model (Model I,  $N = 574$ ).* The ovals represent the first order latent constructs, and the boxes are used to represent the second order latent constructs; One-headed arrows represent regression relationships, while two-headed arrows represent correlational relationships; *BPDT* = *Borderline Personality Disorder traits*; *HADSAnx* = *anxiety sub-scale from the HADS*; *HADSDep* = *depression sub-scale from the HADS*; *IIP-SC 2* = *vindictive/self-centered sub-scale from the IIP-SC*; *IIP-SC 6* = *overly accommodating sub-scale from the IIP-SC*; *IIP-SC 7* = *self-sacrificing sub-scale from the IIP-SC*; *IIP-SC 8* = *intrusive/needy sub-scale from the IIP-SC*; *BIS-11 attentional* = *attentional impulsiveness sub-scale from the BIS-11*; *motor* = *motor impulsiveness sub-scale from the BIS-11*.

**Table 47. General Model IV**

<i>Model</i>	<i>Overall <math>\chi^2</math></i>	<i>df</i>	<i>RMSEA</i>	<i>CI for RMSEA</i>	<i>CFI</i>	<i>TLI</i>
<i>Measurement Model</i>						
<i>(Saturated)</i>	5933.75*	3138	.039	.038 - .041	.875	.871
<i>Revised Model</i>	5261.68*	3132	.034	.033 - .036	.905	.901
<i>Structural Model</i>	5261.68*	3132	.034	.033 - .036	.905	.901

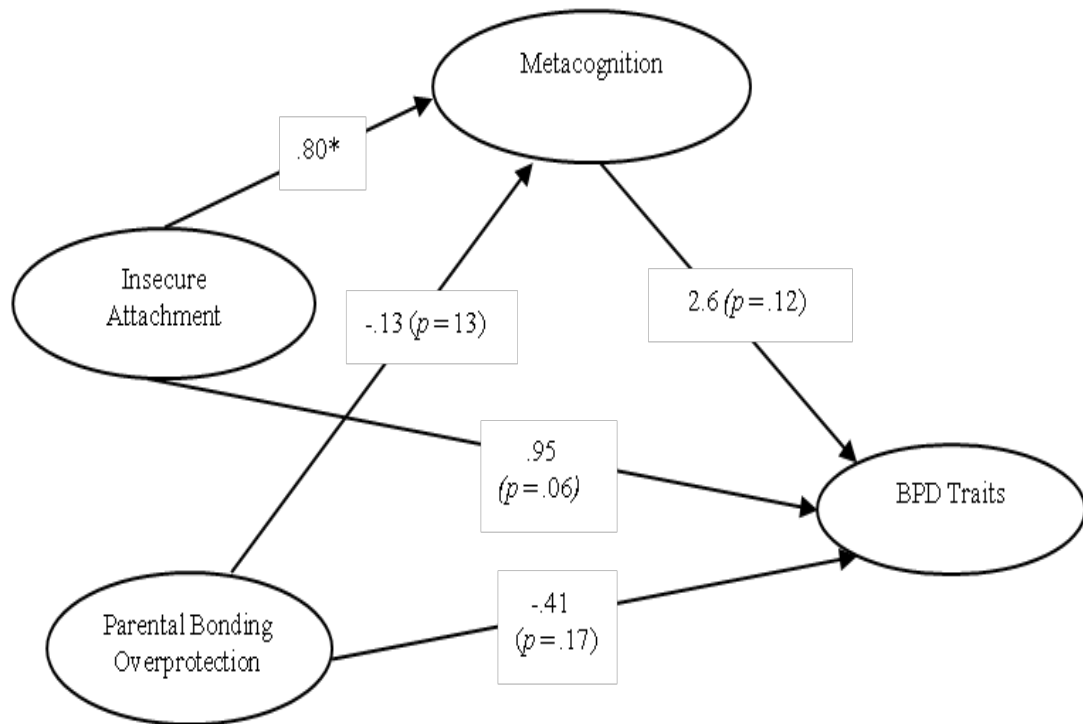
*Note.*  $N = 574$ . RMSEA = root-mean square error of approximation; CFI = comparative fit index; TFI = Tucker Lewis index. \*  $p < .001$ .

#### 4.5.1 Sub-Model 11

*The Role of Metacognition as a Mediator in the Relationship between Parental Bonding Overprotection and Borderline Personality Traits, and in the Relationship between Insecure Attachment, and Borderline Personality Traits.*

The purpose of this sub-model was to investigate whether metacognition mediated the relationship between parental bonding overprotection, insecure attachment and BPD traits. First, following Holmbeck's three-step approach, direct path coefficients from the predictors (parental bonding overprotection and insecure attachment) to the criterion (BPD traits) without the mediating latent variable was measured. The results found the direct relationship between insecure attachment and BPD traits significant ( $b = 1.10, p < .001$ ). The direct relationship between parental bonding overprotection and BPD traits was also significant ( $b = -0.250, p < .001$ ). After that, a partially mediated model adding the mediating paths from insecure attachment to BPD traits via metacognition and from parental bonding overprotection to BPD traits via metacognition to the direct paths from insecure attachment and parental bonding overprotection to the criterion was assessed. Even though the results indicated a good fit to the data:  $\chi^2 (2677, N = 574) = 4719, p < .001$ ; RMSEA = .04 (90% CI = .035 - .038); CFI = .90 and TLI = .90, the path from parental bonding overprotection to metacognition ( $b = -.13, p = .13$ ), the path from metacognition to BPD traits ( $b = 2.64, p = .12$ ), the path from parental bonding overprotection to BPD traits ( $b = -.41,$

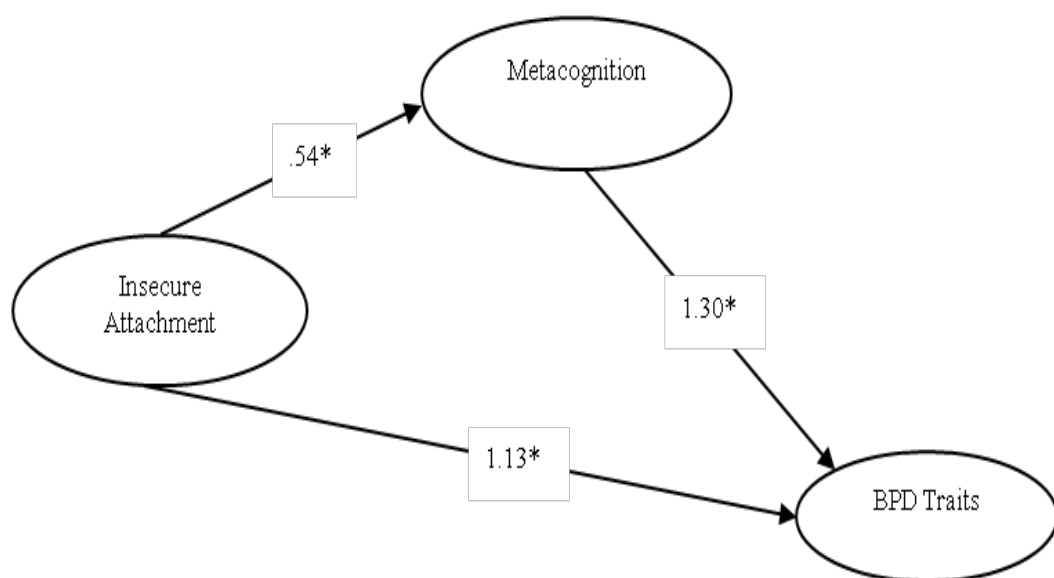
$p = .17$ ), and the path from insecure attachment to BPD traits ( $b = .95$ ,  $p = .06$ ) were not significant (see Figure 36).



**Figure 36. Model A- General Model IV-Sub-Model 11.** \*  $p < .001$ .

According to these results, the relationship between parental bonding overprotection and BPD traits was not mediated by metacognition. Consequently, no further work involving this relationship was pursued. Hence, in order to continue to investigate the mediating effects of metacognition in the relationship between insecure attachment and BPD traits, the original sub-model was modified leaving parental bonding overprotection out of the sub-model. A direct model (Model C) was then assessed. The testing results for Model C indicated a good fit to the data:  $\chi^2(2191, N = 574) = 4474$ ,  $p < .001$ ; RMSEA = .04 (90% CI = .041 - .044); CFI = .88 and TLI = .88 (see Table 48). In the second step of Holmbeck's approach, a partially mediated model (Model A) adding a mediating path from insecure attachment to BPD traits via metacognition to the existing direct path from insecure attachment to the criterion was assessed. The results indicated the new model was still a good fit to the data:  $\chi^2(2190, N = 574) = 4308$ ,  $p < .001$ ; RMSEA = .04 (90% CI = .039 - .043); CFI = .89

and  $TLI = .89$  (see Table 48). The results also indicated the relationship between insecure attachment and metacognition ( $b = .541, p < .001$ ), the relationship between metacognition and BPD traits ( $b = 1.34, p < .001$ ), and the relationship between insecure attachment and BPD traits ( $b = 1.13, p < .001$ ) were all significant (see Figure 37). In the last step in Holmbeck's approach, a fully mediated model (Model B) constraining the direct path coefficient between BPD traits and the predictor was tested. The results indicated this model was also a good fit to the data:  $\chi^2(2192, N = 574) = 4684, p < .001$ ;  $RMSEA = .05$  (90% CI = .043 - .046);  $CFI = .87$  and  $TLI = .87$ . In comparing Models A, B, and C by testing for difference in model fit using the difftest, the comparison between Model A (the partially mediated model) and Model B (the fully mediated model) was statistically significant [83.78 (1),  $p = .000$ ], which meant that the least constrained model, Model A, had to be acknowledged as the model that best fit the data. When Model A and Model C were compared using the difftest, the comparison between both models was also significant [83.78 (1),  $p = .000$ ], which again indicated that the least constrained model, Model A, had to be kept as it was the best fit to the data (see Table 48).



**Figure 37. The Modified Model A for General Model IV-Sub-Model 11.  $*p < .001$ .**

Due to the modification of this model, the changes adopted were the same as the changes in sub-model 9 of Model III. Hence, a null model (Model D) was also assessed. The results of the assessment indicated this model was a poor fit to the data:  $\chi^2 (935, N = 574) = 5959, p < .001$ ; RMSEA = .097 (90% CI = .094 - .099); CFI = .623 and TLI = .601. The fit was so poor that no comparison with Model A was needed. Consequently, Model A was selected as the model that best fit the data.

**Table 48.** *Sub-Model 11(modified) alternative models*

<i>Model</i>	<i>Overall <math>\chi^2</math></i>	<i>df</i>	<i>RMSEA</i>	<i>CI for RMSEA</i>	<i>CFI</i>	<i>TLI</i>	<i><math>\Delta \chi^2 (df)</math></i>
<i>Saturated</i>	4308.15*	2190	.041	.039 - .043	.892	.888	
<i>Model A</i>	4308.15*	2190	.041	.039 - .043	.892	.888	(Model that best fit the data)
<i>Model B</i>	4684.32*	2192	.045	.043 - .046	.873	.868	<sup>(1)</sup> 83.78 (2) p=.000
<i>Model C</i>	4474.23*	2191	.043	.041 - .044	.884	.879	<sup>(2)</sup> 84.66 (1) p=.000
<i>Model D</i>	9175.84*	2194	.074	.073 - .076	.644	.630	N/A

*Note.*  $N = 574$ . RMSEA = root-mean square error of approximation; CFI = comparative fit index; TFI = Tucker Lewis index; Saturated model = all parameters estimated; Model A = the direct path from both predictors to the criterion in addition to their mediating paths estimated (same as the partially mediated model); Model B= the mediating paths without the direct paths from the predictors to the criterion estimated (same as the fully mediated model); Model C= the effects of the predictor insecure attachment on the criterion BPD traits in the absence of the mediator estimated (same as the direct model); Model D= all parameters fixed at zero (same as the null model). <sup>(1)</sup> Difftest results comparing Model A with Model B (Model A was a better fit to the data); <sup>(2)</sup> Difftest results comparing Model A with Model C (Model A was a better fit to the data); <sup>(3)</sup> Difftest results comparing Model A with Model D (Model A was a better fit to the data). \*  $ps < .001$ .

A SEM analysis of the data using the partially mediated model to assess for the standardized mediational effects of the mediators indicated that metacognition partially mediated the relationship between insecure attachment and BPD traits. Metacognition significantly predicted BPD traits ( $b = 2.4$ ,  $SE = .78$ ,  $\beta = .79$ ,  $p < .002$ ), and was also found to be significantly related to insecure attachment ( $b = .84$ ,  $SE = .13$ ,  $\beta = .65$ ,  $p < .000$ ). The indirect effect tested using bootstrapped standard errors (see Table 49) was also significant ( $b = 2.06$ ,  $SE = .80$ ,  $p < .010$ ). These findings supported the hypothesized mediational model.

**Table 49.** *Mediation Results (Bootstrapped Effect Sizes) - The Effects of Metacognition as a mediator in the relationship between insecure attachment and BPD traits.*

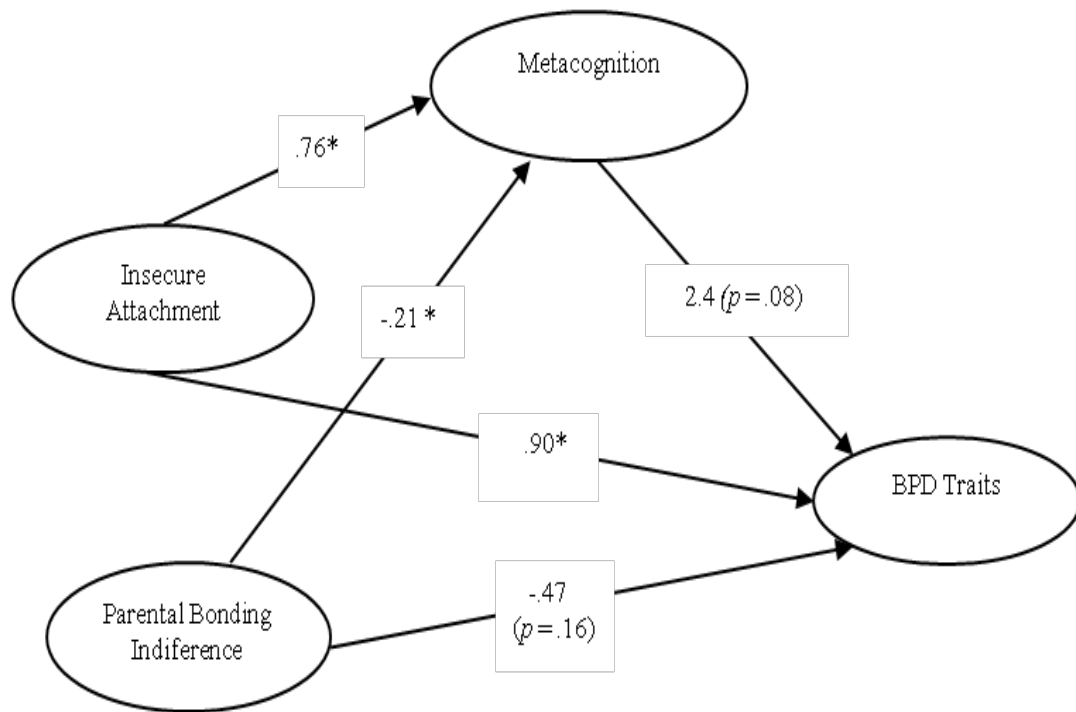
Indirect Effects				Confidence Intervals		
Mediator	Estimate	S.E.	P-Value	Lower 5%	Estimate	Upper 5%
METACOG Attach → BPDT	2.062	.803	.010	.742	2.062	3.38
Total Indirect Effect	2.062	.803	.010	.742	2.062	3.38

*Note.*  $N = 574$ . METACOG = Metacognition (proposed mediator); Attach = Insecure Attachment; BPDT = Borderline Personality Traits.

#### 4.5.2 Sub-Model 12

*The Role of Metacognition as a Mediator in the Relationship between Parental Bonding Indifference and Borderline Personality Traits, and in the Relationship between Insecure Attachment, and Borderline Personality Traits.*

The purpose of this sub-model was to investigate whether metacognition mediated the relationship between parental bonding indifference, attachment and BPD traits. First, following Holmbeck's three-step approach, direct path coefficient from the predictor (insecure attachment) to the criterion (BPD traits) without the mediating latent variable was measured. The results found the direct relationship between insecure attachment and BPD traits significant ( $b = 1.04, p < .001$ ). The direct relationship between parental bonding indifference and BPD traits was also significant ( $b = -0.256, p < .002$ ). After that, a partially mediated model adding the mediating paths from insecure attachment to BPD traits via metacognition and from parental bonding indifference to BPD traits via metacognition to the direct paths from insecure attachment and parental bonding indifference to the criterion was assessed. Even though the results indicated a good fit to the data:  $\chi^2 (2604, N = 574) = 4678, p < .001$ ; RMSEA = .04 (90% CI = .036 - .039); CFI = .90 and TLI = .90, the path from parental bonding indifference to BPD traits ( $b = -.47, p = .16$ ), and the path from metacognition to BPDT traits ( $b = 2.4, p = .08$ ) were not significant (see Figure 38). According to these results, the relationship between parental bonding indifference and BPD traits was not mediated by metacognition. Considering these results, the next step would have been to remove parental bonding indifference from the model, and to continue to assess the relationship between insecure attachment and BPD traits; however, since this relationship had already been assessed in the previous sub-model (sub-model 11), no further processing relating to this sub-model was necessary.



**Figure 38. Model A-General Model IV-Sub-Model 12.** \* $p < .04$ .

#### 4.6 Summary of Key Findings

Regarding hypotheses 1 through 6:

- There was a direct relationship between all three forms of childhood maltreatment and the BPD traits construct.
- The relationship between sexual childhood abuse and the BPD traits construct was mediated by metacognition.
- The relationship between physical childhood abuse and the BPD traits construct was mediated by metacognition.
- The relationship between emotional childhood abuse and the BPD construct was mediated by metacognition.

Regarding hypotheses 7 through 12:

- The relationship between sexual childhood abuse and the BPD traits construct was mediated by emotion regulation suppression and also by the lack of emotion regulation reappraisal.



- The relationship between physical childhood abuse and the BPD traits construct was mediated by emotion regulation suppression but it was not mediated by emotion regulation reappraisal.
- The relationship between emotional childhood abuse and the BPD construct was not mediated by emotion regulation suppression, and it was not mediated by the lack of emotion regulation reappraisal either.

Regarding hypotheses 13 through 21:

- There was a direct relationship between all three hypothesized predictors (parental bonding indifference, parental bonding overprotection, and insecure attachment) and the BPD traits construct.
- The relationship between parental bonding indifference and the BPD traits construct was not mediated by emotion regulation suppression, and it was not mediated by the lack of emotion regulation reappraisal either.
- The relationship between parental bonding overprotection and the BPD traits construct was not mediated by emotion regulation suppression, and it was not mediated by the lack of emotion regulation reappraisal either.
- The relationship between insecure attachment and the BPD traits construct was mediated by emotion regulation reappraisal, but it was not mediated by emotion regulation suppression.

Regarding hypotheses 22 through 24:

- The relationship between parental bonding indifference and the BPD traits construct was not mediated by metacognition.
- The relationship between parental bonding overprotection and the BPD traits construct was not mediated by metacognition.
- The relationship between insecure attachment and the BPD traits construct was mediated by metacognition.

## 5 DISCUSSION

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The purpose of the present study was to assess the mediating effects of metacognition, emotion regulation suppression, and the lack of emotion regulation reappraisal on the relationship between specific forms of childhood maltreatment and a composite of features associated with BPD. This study also aimed to test the mediation effects of metacognition, emotion regulation suppression, and the lack of emotion regulation reappraisal on the relationship between adult attachment, parental bonding, and a composite of BPD associated features in a sample of students from colleges and universities in the city of Edinburgh, Scotland.

### **5.1 Childhood Abuse and BPD Traits (Model I - Metacognition as Mediator)**

As noted by Fonagy and Target (1997), there is clear evidence to suggest that individuals who were victimized as children may have difficulties developing a healthy capacity to mentalize. According to Fonagy and Target, the evidence also suggests that these same individuals may acquire a poor sense of self that may ultimately lead to partial impairments in mentalization. Bowlby (1969) postulated that the healthy development of attachment relationships was greatly dependent on the “consistency and appropriateness of the responses” by parents or caregivers to the basic needs of their children. According to the current literature, the healthy development of a person can be negatively impacted in cases where abuse and/or neglect are prevalent (Fenfang, & Godinet, 2014; Brown, Craig, & Harris, 2008; Zlotnick et al., 2008). According to Fonagy (1998), the appropriate development of metacognitive abilities on an individual depends greatly on that individual’s healthy attachment relationships with parents or caretakers. And since abuse in the parent-child relationship has been recognized as an etiological vulnerability found in a wide range of problems (many of which have been associated with insecure attachment). It would be therefore logical to think that individuals who were abused as children are likely to exhibit a limited metacognitive capacity. Furthermore, since a healthy

metacognitive capacity is essential for the successful development of adequate social interaction and personal relationships (Frith & Singer, 2008), the chaos experienced by individuals with BPD in social and interpersonal relationships is not surprising. Nevertheless, despite the often suggested links between attachment and BPD, and between childhood abuse and BPD, no studies attempting to examine either of these relationships utilising mentalization, metacognition, or theory of mind as a mediator or as a moderator were found during the systematic review of the current literature (please refer back to Chapter 2).

The role of childhood emotional abuse as an environmental stressor associated with the development of BPD features has been established previously (Bornovalova, Gratz, Delany-Brumsey, Paulson, & Lejuez, 2006; Gratz, Latzman, Tull, Reynolds, & Lejuez, 2011; Gratz, Tull, Baruch, Bornovalova, & Lejuez 2008; Laporte, Paris, Guttman, & Russell, 2011; Linehan, 1993; Paris, 1997; Zanarini & Frankenburg, 1997). In line with current research, the results of this study indicated that the direct relationship between emotional abuse and the composite of features associated with BPD was significant. The relationships between sexual abuse and BPD traits and between physical abuse and BPD traits were also significant. These results suggest that all three particular forms of childhood maltreatment investigated in this study are uniquely associated to BPD traits. Hence, they also provide support to the role of childhood maltreatment in the development of BPD features in adulthood which is consistent with the literature; specifically, emotional abuse (Bornovalova et al., 2006; Gibb, Wheeler, Alloy, & Abramson, 2001; Zanarini, et al., 1997), sexual abuse (Gibb, 2001, et al., 2001; Elzy, 2011; Shearer, Peters, Quaytman, & Ogden, 1990; Silk, Lee, Hill, & Lohr, 1995; Zweig & Paris, 1991), and physical abuse (Herman, Perry, van der Kolk, 1989; Soloff, Lynch, & Kelly, 2002; Trull, 2001; Zanarini, et al., 1997). However, even though these results showed direct links between each individual type of childhood maltreatment and BPD features, the findings indicated that not a single type of abuse alone accounted for the total effect on features from the composite of BPD characteristics constructed for this study. Hence, this opens the possibility that other unknown factors may also play a role in the relationship between childhood maltreatment and BPD. This is in line with the childhood

maltreatment/BPD literature which suggests that it is unlikely that emotional abuse, or any other type of abuse, can solely account for the development of BPD features due to the complexity of borderline personality pathology (Winston, 2000).

Also in agreement with the literature, the results of this study indicated that metacognition partially mediated the relationship between emotional childhood abuse and BPD traits. Similarly, the findings showed that metacognition partially mediated the relationship between sexual abuse and the BPD traits composite, and also mediated the relationship between physical abuse and features associated with BPD. This indicated that in addition to the direct effects of emotional, sexual, and physical abuse on indices of BPD features, all three types of abuse have an indirect effect on the BPD features composite through metacognition. In other words, the results imply that individuals who experienced emotional, sexual and/or physical abuse as children are more likely to have an inhibited ability to recognize, attribute, and interpret the thoughts, the beliefs, and the emotions of other people and of themselves, which in turn will make them prone to exhibit more BPD related features in adulthood than individuals who were not abused. Furthermore, the results from the present study indicate that failures in metacognition may contribute to the exacerbation of pathological traits such as anxiousness, depressivity, separation anxiety, impulsivity, and hostility in individuals who were emotionally, sexually, and/or physically abused in childhood. In addition, metacognition may also play an important role in the worsening of difficulties in personality functioning in the areas of empathy and intimacy concerning these same individuals.

It is important to note that childhood abuse and/or attachment problems may not be the only contributors to the development of BPD traits and/or metacognitive problems, in the same way that mentalizing/metacognitive deficits are not always associated with childhood trauma or with the development of BPD related features in adulthood. For example, some studies have investigated the causal role of metacognition in the development of anxiety and depression symptoms (Yilmaz, Gençöz, & Wells, 2011) in obsessive-compulsive disorder and anxiety symptoms (Irak & Tosun, 2008) in obsessive-compulsive disorder and panic disorder (Cucchi et

al., 2012), etc. Other factors in the development of BPD features that have been explored include childhood ADHD (Carlotta, Borrini, Maffel, & Fossati, 2013), the role of executive functioning (Gvirts, Harari, Braw, Shefet, Shamay-Tsoory, & Yechiel Levkovitz, 2012), emotion dysregulation (Stepp, Scott, Morse, Nolf, Hallquist, & Pilkonis, in press), etc. Other studies have investigated the mediating role of metacognition in the relationship between parenting factors and trait anxiety (Gallagher & Cartwright-Hatton, 2008), between emotion and alcohol dependence (Moneta, 2011), and between emotion and smoking dependence (Spada, Nikčević, Moneta, & Wells, 2008), etc.

To summarize, three specific conclusions can be drawn from the results obtained in Model I, all of which support the proposed hypotheses for this model. First, emotional childhood maltreatment had both a direct effect on the development of borderline related features in adulthood and an indirect effect through metacognition. Second, sexual childhood maltreatment had both a direct effect on the development of borderline related features in adulthood and an indirect effect through metacognition. And third, physical childhood maltreatment had both a direct effect on the development of borderline related features in adulthood and an indirect effect through metacognition.

## **5.2 Childhood Abuse and BPD Traits (Model II - Emotion Regulation Suppression and the Lack to Emotion Regulation Reappraisal as Mediators)**

Even though the role of emotion regulation in the development of BPD features has long been suspected (Yen, Zlotnick, & Costello, 2002), this had been elusive and unfounded until recently (Rosenthal et al., 2005). However, as noted by Rosenthal and colleagues, even as empirical evidence supporting the role of emotion regulation in the development of BPD features starts to emerge, the way this process occurs remains unknown and greatly unexplored. It is thought that childhood maltreatment can only lead to the development of BPD features in “the context of underlying trait vulnerabilities” such as affective dysfunction, disinhibition, etc. (Paris, 2000). Trait

vulnerabilities can be divided into two groups: higher-order traits and lower-order traits. As far as BPD is concerned, emotion-related traits appear to be most relevant. Higher order traits include affective dysfunction and disinhibition. Lower-order traits derived from affective dysfunction that have been linked to BPD include anxiousness, affective liability, emotional intensity, reactivity, and affective instability; while the lower-order traits derived from disinhibition that have been linked to BPD include impulsivity, risk-taking, sensation seeking, and novelty seeking (Gratz et al., 2011). It is important to note that these traits are not exclusively related to BPD, and may be present in several other mental disorders (Paris, 2000). As already stated in the previous section, the results of this study showed the direct relationships between emotional, sexual, and physical childhood abuse and the composite of features associated with BPD were all significant. In line with the literature and as hypothesized, the results of this study indicated that emotion regulation suppression partially mediated the relationship between sexual childhood abuse and the composite of BPD traits. Similarly, the results also indicated that emotion regulation suppression partially mediated the relationship between physical childhood abuse and the composite of BPD traits. However, contrary to what was expected, the results of the current study did not support the mediation effect of emotion regulation suppression on the relationship between emotional childhood abuse and the development of BPD related features.

This suggests that emotion regulation suppression may contribute to the development of pathological traits such as anxiousness, depressivity, separation anxiety, impulsivity, and hostility in individuals who were sexually, and/or physically abused in childhood. In addition, emotion regulation suppression may also play an important role in the worsening of difficulties in personality functioning in the areas of empathy and intimacy. In the case of emotional childhood abuse however, the results suggest that emotion regulation suppression does not play a role in the development of pathological traits and difficulties in personality functioning associated with BPD.

The finding indicating that the relationship between emotional childhood abuse and BPD related features was not mediated by emotion regulation suppression is important. It could be argued that compared to sexual and physical childhood abuse, emotional abuse may have less impact on childhood development as far as BPD related features is concerned. However, it is important to note that while the mediation effect of emotion regulation suppression was not significant, the direct relationship between emotional childhood abuse and emotion regulation suppression was significant. The inference here is that experiencing emotional abuse in childhood may lead to problems with emotion regulation suppression; nevertheless, these problems do not appear to be associated with BPD related traits.

Regarding the lack of emotion regulation reappraisal, the results of the study indicate that this is an issue affecting only those individuals who were sexually abused in childhood, and it does not affect those who experienced emotional and/or physical abuse as children. In the case of individuals with a history of sexual childhood abuse, the lack of emotion regulation reappraisal may interact with emotion regulation suppression in the heightening of pathological traits and difficulties in personality functioning associated with BPD. However, the degree to which this may occur is unknown and beyond the scope of this study.

Generally speaking, the findings of this study regarding emotion regulation suppression and the lack of emotion regulation reappraisal support the assertion that there may be more than just one factor influencing the relationships between a particular form of childhood maltreatment and the development of BPD related traits. Nevertheless, as previously noted in the systematic review part of this thesis, additional research is needed before more specific conclusions can be reached.

As in the case of metacognition, problems in emotion regulation suppression and/or the lack of emotion regulation reappraisal do not necessarily indicate a connection to childhood maltreatment and/or BPD related features. Emotion regulation has been investigated as a mediator in relationship between dysfunctional attitudes and depressive symptoms (Vanderhasselt, Koster, Onraedt, Bruyneel, Goubert, & De

Raedt, 2014), depression and reduced heart rate (Patron, Benvenuti, Favretto, Gasparotto, & Palomba, 2014), etc. The role of emotion regulation has also been investigated in relationship to a number of mental disorders including bipolar disorder (Fletcher, Parker, Bayes, Paterson, & McClure, 2014; Wolkenstein, Zwick, Hautzinger, & Joormann, 2013), social anxiety (Goldin, Lee, Ziv, Jazaieri, Heimberg, & Gross, in press), autism spectrum disorders (Masefsky & white, 2014), anorexia nervosa (Manuel & Wade, 2013), hoarding disorder (Fernandez de la Cruz et al., 2013), etc. Hence, taking into consideration that emotion regulation suppression has consistently been associated with indices of psychopathology (Krause, Mendelson, & Lynch, 2003; Lynch et al., 2001), and since direct relationships were found between sexual and physical childhood abuse and emotion regulation suppression, and between sexual childhood abuse and the lack of emotion regulation suppression, the findings of this study may also be relevant to other areas of psychopathology.

To summarize, several conclusions can be drawn from the results obtained in Model II that support some of the proposed hypotheses for this model, but not all. First, childhood sexual maltreatment had an indirect effect on the borderline features construct through both emotion regulation suppression, and the lack of emotion regulation reappraisal. Second, childhood physical abuse had an indirect effect on the development of borderline features in adulthood through emotion regulation suppression, but it had no impact through the lack of emotion regulation reappraisal. And last, while there was a direct relationship between emotional childhood abuse and the development of borderline traits in adulthood, the indirect effects through emotion regulation suppression and through the lack of emotion regulation reappraisal were non-existent. Hence, the proposed hypotheses for the mediating effects of emotion regulation suppression between childhood abuse and BPD related features were confirmed for sexual and physical abuse, but not for emotional abuse. In addition, the proposed hypotheses for the mediating effects of the lack of emotion regulation reappraisal on the same relationships were confirmed for sexual abuse only.



### **5.3 Adult attachment, Parental bonding, and BPD Traits (Emotion Regulation Suppression and the Lack to Emotion Regulation Reappraisal as Mediators)**

Borderline personality disorder and personality disorders in general have been found to be strongly associated with dimensions of attachment (Choi-Kain, Fitzmaurice, Zanarini, Laverdiere, & Gunderson, 2009; Fossati et al., 2003; Shorey & Snyder, 2006). Moreover, insecure patterns of attachment have been found to be a significant risk factor for several forms of psychological and social maladjustment and they are also known to play a contributing and perpetuating role in a wide range of mental disorders (Rholes & Simpson, 2004). Patterns of insecure attachment are prevalent among BPD patients (Keinänen, Johnson, Richards, & Courtney, 2012). Even though there are many differences between adult and childhood attachment, it is important to point out that the same core principles of attachment theory are applied in both areas (Hazan & Shaver, 1990, 1994; Fraley & Shaver, 2000). Moreover, there is enough evidence to suggest that patterns of attachment remain stable through life for most individuals (Scharfe & Bartholomew, 1994). As hypothesized and in accord with the literature, the results of this study indicated that there was a direct relationship between insecure adult attachment and the composite of features associated with BPD. This finding suggests that insecurely attached individuals are at risk of experiencing empathy and intimacy problems in adulthood. In addition, they are also at risk for issues relating to anxiousness, separation insecurity, depressivity, impulsivity, and hostility.

According to Parker (1979), parental bonding is the bond and the contribution of parents in the parent-child relationship; their attitude, behaviour, and emotional availability. Parker noted that the role of parents and their approach to parenting is often neglected in the attachment literature; yet it remains extremely important to the development of the relationship between the child and the parent or caregiver. Parenting styles and parental availability (parental bonding) are often associated with patterns of attachment such as the case of intrusive and unpredictable parenting which has been found to play a role in the development of insecure patterns of

attachment. Unpredictable and intrusive parenting styles have often been noted in the literature as risk factors for BPD (Reich & Zannarini, 2001).

The results of this study indicated there was a direct relationship between parental bonding overprotection and features associated with BPD. Parental overprotection has been found to be correlated with the lack of emotional stability (Avagianou & Zafiropoulou, 2008). Problems with decision making and problem solving, insecurity, inability to adapt to new situations, and abnormal stress levels are all associated with parental overprotection and are also considered risk factors for some mental disorders (Canetti, Bachar, & Galili-Weisstub, 1997). These results strongly suggest that individuals who reported to have been raised by a caregiver who was controlling and over-protective are prone to develop BPD related traits in adulthood. In addition, a direct relationship between parental bonding indifference and the composite of BPD traits was also identified. Parental indifference is characterized by parental lack of interest, unresponsiveness, coldness, little to no show of love and affection, and apathy. Deficits in cognition, inability to show emotions, and socialisation problems are also often associated with parental indifference (Rigby, Slee, & Martin, 2006). The results of this study suggest that individuals who were raised in an environment where parents were unavailable, unwilling and/or unable to provide appropriate care and seek closeness have an increased risk of developing features associated with BPD. These results support the already existing literature on attachment and BPD (taking into consideration that parental bonding is closely associated to attachment) that proposes that insecure adult attachment plays a role in the development of BPD features. Also, given the fact that the area of parental bonding is under-researched, the findings suggesting that both parental bonding overprotection and parental bonding indifference play a role in the development of traits associated with BPD are very relevant.

As stated earlier, one of the known characteristics of a well-adjusted and psychologically healthy individual is a capacity to regulate emotions effectively (Gresham & Gullone, 2012). Individuals who have the ability to regulate emotions appropriately have the capacity, flexibility, and the will to access and promote

adaptive and appropriate responses when faced with potentially emotional situations regardless of the context (Denham, 1998; Gross & Thompson, 2007). Conversely, when an individual lacks the capacity, flexibility and/or the will to access and promote adaptive responses to emotional situations in a variety of settings and regardless of the context, then it can be said that the individual has emotion regulation problems (Denham, 1998). As in the case of insecure patterns of attachment, problems with emotion regulation have been associated with social, developmental, and psychological problems that tend to start in childhood or early adolescence, and continue through adulthood (Maughan & Cicchetti, 2012). The literature on attachment and emotion regulation suggests that the capacity to regulate emotions properly is greatly dependent on the quality of early attachment relationships (Roque, Verissimo, Fernandes, & Rebelo, 2013). In terms of emotion regulation, secure attachment is usually associated with the capacity to be flexible and adaptive when faced with negative emotions; rather than denying such emotions, securely attached individuals deal with emotions appropriately. Insecure attachment on the other hand, is associated with a denial or suppression of emotions and also with a general inability to reinterpret the meaning of an emotionally charged situation so that the perception of such situation does not have a negative emotional impact (Cassidy, 2008).

In agreement with the literature and as hypothesized, the results of this study indicated that the lack of emotion regulation reappraisal partially mediated the relationship between insecure adult attachment and the composite of BPD traits. Emotion regulation reappraisal involves reinterpreting the meaning of a potentially negative event or occurrence into a more realistic and positive situation in order to alter its emotional impact (Gross, 1998a; 1998b). Emotion regulation reappraisal is often associated with positive outcomes and negatively correlated with mental disorders (Aldao, Nolen-Hoeksema, & Schweizer, 2010). Since insecurely attached individuals lack the cognitive flexibility to adapt and reinterpret negative emotions, this result strongly suggests that such individuals struggle with using emotion reappraisal strategies in order to reduce their emotional response to negatively charged events and situations. In consequence, such individuals become even more

vulnerable to problems in personality functioning and to the development of personality traits associated with BPD. Even though adult insecure attachment remained a significant predictor of borderline features in this study, the addition of lack of emotion regulation reappraisal weakened the direct relationship between adult insecure attachment and the BPD traits construct. Therefore, it is evident that the role of the lack of emotion regulation reappraisal is important at least in the exacerbation of BPD related features for individuals with a pattern of adult insecure attachment.

Contrary to what was expected, the hypothesized interaction of the lack of emotion regulation reappraisal in the relationship between parental bonding overprotection and features associated with BPD was not significant. Also unexpected were the results indicating that the lack of emotion regulation reappraisal did not mediate the relationship between parental bonding indifference and the composite of BPD traits. Thus, it can be inferred that the lack of emotion regulation reappraisal does not play a role in the development and/or exacerbation of borderline features in either relationship. However, since a direct path was found for both types of parental bonding and their relationship with BPD traits, the results suggest that the effects of being raised in an overprotective environment or by indifferent caregivers do have consequences which may increase the risk of developing features associated with BPD.

Regarding the use of emotion regulation suppression as a mediator, all the results were also contrary to what was expected. First, the hypothesized interaction of emotion regulation suppression in the relationship between parental bonding overprotection and the composite of core BPD features was not significant. Next, the hypothesized interaction of emotion regulation suppression in the relationship between parental bonding indifference and the composite of BPD traits was not significant either. And finally, emotion regulation suppression did not have an effect in the relationship between adult insecure attachment and features associated with BPD.

Despite of these results, in all three of the relationships above mentioned there was a direct relationship between the predictors and the BPD features construct. In the case of the relationship between adult insecure attachment and the BPD traits construct, a viable explanation could be that since emotion regulation suppression is believed to be a characteristic of adult insecure attachment (Cassidy, 2008), the full contribution of emotion regulation suppression in the development of BPD features is through the direct path and embedded within the features of insecure adult attachment.

On the one hand, the results regarding the use of emotion regulation suppression as a mediator make sense considering that one of the characteristics of emotion regulation suppression is decreased behavioural expression which is diametrically opposed to what would be expected as the inappropriate expression of anger (and other emotions) and difficulties controlling it are often associated with BPD individuals (APA, 2013). On the other hand, research has shown that the suppression of emotions is not an uncommon behaviour among BPD patients (Beblo et al., 2013; Concklin, Bradley, & Westen, 2006; Rosenthal et al., 2005; Saur & Baer, 2009). In this case however, the lack of impact of emotion regulation suppression as a mediator may be related to the specific characteristic of individuals who are considered to have an insecure pattern of attachment and those who were raised in overprotective and/or indifferent environments. In other words, and taking into account the existence of a direct relationship between BPD and insecure patterns of attachment, and between BPD and overprotective and indifferent parental bonding styles, it is possible that individuals fitting into any of those groups are less prone to suppress their emotions than others.

Another possibility regarding adult insecure attachment may be that emotion regulation suppression has different effects in each of the three adult patterns of insecure attachment hypothesized by Bartholomew and Horowitz (preoccupied, dismissing, and fearful; 1991). In a study conducted by Gillath and colleagues (2005), the researchers found that individuals with a pattern of attachment high in avoidance (dismissive and fearful insecure attachment) were more likely to suppress

negative thoughts than individuals with a pattern of attachment low in avoidance (secure attachment and preoccupied insecure attachment). Since only a general pattern of insecure attachment was used for this study, it is possible that an effect may not have been detected for this reason.

To summarize, the conclusions based on the results obtained in Model III were as follow: First, the relationship between a pattern of adult insecure attachment and the BPD features construct mediated by emotion regulation reappraisal was the only relationship in which an effect from the proposed mediators was found. And second, all the direct relationships in this model were found to be significant which attested to the importance of the role all the factors analysed in this model play in problems of personality functioning and in the development of traits associated with BPD.

#### **5.4 Adult attachment, Parental bonding, and BPD Traits (Metacognition)**

As previously noted, according to Fonagy (1998), the development of mentalizing/metacognitive skills is heavily dependent on early attachment relationships. According to attachment theory, as proposed by Bowlby (1969, 1973, 1977, 1982), internal working models or mental representations are developed through experiences with caregivers and the cognitive interpretation of those experiences. Bowlby (1973) argued that internal working models are relational-specific in the first stages of human development but become more complex as a child develops. Eventually, even though still influenced by experience with caregivers and other important figures in a person's life, internal working models become more dependent on cognition and less relationship-specific. This process becomes apparent in late adolescence and it typically culminates in early adulthood (1973). Bretherton (1992) noted that by this time the "perception" of a relationship becomes more important than the relationship itself. This has led some to argue that attachment is intrinsically linked to cognitive processes in bidirectional relationships that become extremely important in adulthood (Stievenart, Roskam, Meunier, & van de Moortele, 2012). Hence, it is likely that the ability to recognize, interpret, and attribute mental states of self and others (i.e. ToM, mentalization, or metacognition)

is strongly and inevitably associated with the attachment process (Hünefeldt, Laghi, Ortu, & Olivetti-Belardinelli, 2013).

In line with the literature and as hypothesized, the results of this study indicated there was a direct relationship between adult insecure attachment and features associated with the BPD construct. In addition, the results showed that metacognition partially mediated the relationship between adult insecure attachment and the composite of BPD traits. These results suggest that adults with insecure patterns of attachment are more likely to have an inhibited ability to recognize, attribute, and interpret the thoughts, the beliefs, and the emotions of other people and of themselves, which in turn will make them more prone to exhibit pathological traits such as anxiousness, depressivity, separation anxiety, impulsivity, and hostility than securely attached individuals.

In the case of parental bonding and its relationship to metacognition mentalization or ToM, some studies that talked about this relationship were found (all of which were included at some point in the systematic review part of this study but did not reach the final stage). However the literature in this area is scarce when compared to that of attachment. This is especially noticeable in areas related to BPD. During the systematic review, only two studies were found that referred to the relationship between parental bonding and metacognition. However, it is important to note that (for different reasons) neither study met the criteria of inclusion; hence, they were not included in the final stage of the review. In the first study conducted by Gallagher and Cartwright-Hatton (2008), the relationship between parenting factors (using the PBI) and trait anxiety using metacognition as a mediator was investigated. Metacognition was found to partially mediate this relationship. In the second study conducted by Leithner-Dziubas, Bluml, Naderer, Tmej, and Fischer (2010), the relationship between parental bonding and the capacity to mentalize among chronic pelvic patients was investigated. The researchers found a correlation between parental bonding (maternal bonding only and unknown type) and a lower capacity to mentalize. Unfortunately no other data could be extracted as only the abstract was available in English. This however was enough reason to further investigate the

relationship between parental bonding and BPD features mediated by metacognition despite the lack of supporting literature. Taking into consideration the results of the studies above mentioned and the close relationship of parental bonding with attachment, finding significant results was a possibility. As previously established in the results from the emotion regulation constructs and in agreement with the postulated hypotheses, the results indicated that there was a direct relationship between parental bonding overprotection and traits associated with BPD, and also a direct relationship between parental bonding indifference and traits associated with BPD. However, the results indicated that metacognition was not a mediator in any of the relationships involving parental bonding. Hence, these results suggest that while there is a direct relationship between individuals who were raised in an environment where parents were unavailable, unwilling and/or unable to provide appropriate care and seek closeness and the development of features associated with BPD, these relationships are unaffected by an individual's inability to recognize, attribute, and interpret the thoughts, the beliefs, and the emotions of other people and of self.

To summarize, the conclusions based on the results obtained in Model IV were as follow: First, the direct relationships between both forms of parental bonding and features associated with BPD stated in the emotion regulation section were confirmed. Second, Metacognition was found to mediate the relationship between patterns of adult insecure attachment and features associated with BPD. And third, metacognition did not mediate the relationship between parental bonding indifference and BPD traits; and it did not mediate the relationship between parental bonding overprotection and BPD traits either.



## **5.5 Other Relevant Issues**

### **5.5.1 Participant differences**

Since selection and sampling bias are significant problems in studies where self-report measures are used (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003), it was important to investigate if there were any differences in regards to basic demographic characteristics between participants who accessed the survey but for some reason failed to complete it, and participants who successfully concluded it. The results indicated there were no significant differences in regards to age, ethnicity, or gender between those who completed the survey and those who did not progress beyond the first half of the first scale. Therefore, there was no evidence of inherited bias between the group that completed the survey and the group that did not. In other words, this suggests that even though these groups took different attitudes towards the survey, the participants' age, ethnicity, and/or gender were not likely to have played a role in their decision to either stop or continue to take part in the survey.

### **5.5.2 Generalizing to clinical populations**

Despite the known difficulties of generalizing results from non-clinical to clinical populations, these difficulties do not necessarily apply in the same way to mental disorders when viewed dimensionally instead of categorically (Abramowitz et al., 2014). Specifically, since meeting an appropriate diagnosis for BPD (essential when working with clinical populations) becomes irrelevant in a dimensional approach as full attention focuses on presenting symptoms and range and severity in a continuum. In consequence, when taking a dimensional approach, the use of non-clinical populations becomes an essential first step in the investigation of aetiological and contributing factors to the development of BPD. For that reason, while the generalizability of the results obtained in this study is limited because of the select group of participants used (i.e. university students), the results are still relevant as important information was found regarding the aetiology and internal mechanisms that may lead to the development of features associated with BPD. Ultimately, such information could be used to inform clinicians and to develop prevention and early

intervention strategies, which could have an effect on the treatment of patients presenting features of BPD (rather than meeting the threshold for the disorder).

In the case of BPD clinical populations, taking into account the findings of this study regarding the mediating role of emotion regulation and metacognition in the development of BPD traits among individuals with a history of maltreatment and despite the student population used, the results of this study still provide important information that could be applicable to BPD patients with a history of childhood maltreatment. This information could be used not only to inform clinicians, but to help in the development and introduction of metacognitive and emotion regulation techniques that could be incorporated into the treatment of BPD patients. For instance, if a BPD patient was taught to self-regulate his/her emotions by learning to use emotion regulation reappraisal, it is likely that a change in the way he/she relates to others in inter-personal and social situation would be observed. As a consequence, an overall improvement in the patient's relatedness to others and thus a general improvement in quality of life may occur. This could be very significant from a clinical perspective as it could mean the difference between a patient meeting a BPD diagnosis and a patient falling just below the clinical threshold of BPD. Most importantly however, this is likely to have a direct impact on areas related to the patient's personality functioning and pathological personality traits.

In this case however, it is important to point out that metacognitive and/or emotion regulation strategies have already been incorporated into psychotherapeutic treatments such is the case of Dialectical Behavioral Therapy (DBT) which emphasises the appropriate development of self-regulation of emotions through the use of behavioural techniques, and Mentalization Based Treatment (MBT) which is aimed to develop the patient's self-regulation capacity through a multi-modal approach. Hence, even though the results of the study do not allow for the proposal of new and innovative approaches to the treatment of symptoms associated with BPD, the results provide specific and direct avenues that could be incorporated to existing techniques used in DBT and MBT. Furthermore, these findings could theoretically be developed into a new and more refined form of treatment different

from DBT and MBT; a treatment that could be geared specifically to individuals presenting BPD symptoms and who have a history of childhood abuse. It is also important to note that these results also provide indirect support to the approach to treatment of BPD patients used by both BDT and MBT which is important given the fact that the number of studies relating to effective treatments for BPD remains limited.

Regarding the development of early intervention strategies and concerning childhood abuse, metacognition, and the development of BPD traits, interventions and educational programs could be developed to target students with a history of childhood abuse with emphasis in increasing self-awareness and effective self-regulation through the use of metacognitive strategies. Taking into consideration that BPD is characterized by a difficulty to sustain stable relationships as a result of personal and emotional instability, an increased sense of self-awareness and the use of self-regulation effectively would be highly advantageous. These early intervention strategies may help students to develop healthier interpersonal relationships which in turn may lead to an overall improvement in their quality of life. Most importantly however, an increased sense of self-awareness and the use of self-regulation could potentially ameliorate or even hinder the development of BPD associated features in individuals with abuse histories.

### **5.5.3 Comorbidity**

The release of the DSM-5 and the inclusion of the alternative hybrid dimensional criteria to diagnose BPD in section III opened the door (even if just for research purposes) to look at the issue of comorbidity in a different way which, according to the APA (2013), is more consistent with “current diagnostic practice”. Specifically, a clinician can look at the individual presenting symptoms and evaluate them in terms of intensity and duration along a continuum, rather than in a dichotomous “yes” or “no” manner. Furthermore, in the case of BPD, by including traits of “anxiousness” and “depressivity” as pathological personality traits, and as part of the overall umbrella covering BPD, the issue of comorbidity with anxiety disorders and depression became less important as comorbidity was replaced by a level of severity.

This is significant because it allows for a more accurate picture of BPD in which depressive and anxious symptoms are seen as part of the pathological traits of BPD rather than distinct comorbid disorders.

Thus, regarding this study, since one of the main purposes was to stay within the hybrid alternative dimensional criteria proposed in the DSM-5 as evidenced in the construction of the composite of BPD features used throughout, the depressive and anxious symptoms exhibited by participants are seen as a reflection of pathological personality traits rather than comorbid features of anxiety and/or depression. It is important to recognize however, that the collection of personality traits suggested for BPD, while well investigated, is still in the early stages of research. Also important, regarding comorbidity is the fact that if this study had used the old DSM-IV or the current DSM-5 diagnostic criteria rather than the alternative model featured in section III of the DSM-5 as a base, then differentiating between the depressive or anxious symptoms that often accompany BPD and comorbid anxiety or comorbid depression would have been practically impossible without more information. In consequence, significant changes to this research project would have been necessary. In such situation, it is difficult to predict what the end result would have been, but it is also difficult to foresee any major changes in the final results since depression and anxiety are both seen as common features part of BPD in practical clinical practice. Nonetheless, the fact remains that a simple change in the conceptualization of the initial diagnostic criteria may have seriously hindered or at least limited this research project. It is important to point out however that limitation to research by the current dichotomous approach to diagnosis is perhaps one of the most important arguments in favour of a hybrid or a full dimensional approach.

## **5.6 Limitations**

Since this study relied heavily on self-report measures, it is important to discuss the advantages and disadvantages of this method of assessment. There are several limitations associated with the use of self-report measures. First, it is not possible to establish causality from self-report measures as unknown variables not accounted/considered in the questions being asked may affect the outcome. Second,

there are significant issues regarding the validity of such measures as respondents may not always be honest with their answers due to social desirability and/or other reasons; in other words, self-report bias (Paulhus & Vazire, 2007). Next, recall period which is related to the difficulty of participants in recalling events that happened in the past accurately. This, in turn, may also lead to selective recall (Fadnes, Taube, & Tylleskär, 2009). And last, problems with interpretation of the questions as respondents' interpretation of the same question may be dissimilar (Fadnes, Taube, & Tylleskär, 2009). Such is the case of cultural limitations. It has been suggested that different cultures may answer self-reports designed for North American and European cultures differently (Hamamura, Heine, & Paulhus, 2008).

While it is often easier to concentrate on the limitations of self-report measures, it is also important to highlight the advantages that such method of assessment provides. First of all, and relevant to this study, self-report measures allow researchers to study large numbers of participants in a fairly straightforward manner (Paulhus & Vazire, 2007). Second, self-report measures allow researchers to examine a large number of variables at one time (McDonald, 2008) which was essential to this study. Third, response and interviewer biases (a potential problem in interviews), and design biases (a potential issue in psychometric assessment) are minimised when using self-report measures (Paulhus & Vazire, 2007). Next, if a large number of participants were to be selected and randomly assigned, in theory, it should be possible to generalize the results to a larger population. And last, surveys using self-report measures are rather inexpensive.

More significant however, is the fact that even with the many limitations, self-report measures may still provide important and relevant information (Ericsson & Simon, 1993). Since all self-report methods (interviews, psychological assessments, psychometric testing) have strengths and limitations, ideally, a combination of various assessment methods should be used when gathering information from participants (Churchill, 2000). Nevertheless, that may not be feasible in all situations and the researcher(s) must sometimes compromise as was the case for this study.

Regarding the present study, there were several limitations and important methodological issues that need to be discussed. One of the main limitations, as above mentioned, was that the assessment of all constructs of interest relied solely in the use of self-report measures. Therefore, due to the nature of such measures, the possibility of self-report bias cannot be eliminated. This is especially true when responding to difficult and invasive personal questions as those contained in the CTQ and, to some extent, the PBI where the passage of time and the secrecy surrounding the types of experiences targeted by these measures may influence the respondent to provide distorted answers. Regarding the CTQ, since actual abuse cannot be corroborated given the fact that the CTQ is a retrospective measure, the possibility of retrospective bias is high and must always be taken into account when attempting to generalize studies that made use of this measure (Gratz et al., 2008).

Another issue associated with self-report measures is the limited range of the questions. In the case of childhood maltreatment for example, while the questions in the CTQ allow researchers to investigate the existence of childhood maltreatment and specific types of abuse and neglect, the nature of the questions does not allow for the measurement of severity, frequency, and duration of the abuse with the exactitude a face to face interview would provide. The same underlying principles apply to all measures used in the battery assessment constructed for this study. In addition, the use of just one measure and/or scale to define most of the constructs or latent variables postulated in this study (with the exception of the BPD composite) is also a limitation. However, given that the battery of measures presented to the participants in the form of a survey was time consuming, some sacrifices had to be made. For example, the use of the Beck Anxiety Inventory (BAI) and the Beck Depression Inventory II (BDI-II) instead of the HADS was initially considered in order to assess for symptoms of anxiety and depression separately; however, the time expected to administer the BAI (21 questions-between 5 to 10 minutes) and the BDI-II (also 21 questions-between 5 to 10 minutes) when compared to the HADS (14 items-5 minutes total) would have been significantly more arduous on the participants. In turn, this could have led to fewer participants completing the survey. Another example was the use of the RSQ instead of using the Adult Attachment

Interview (AAI). Even though some of the attachment constructs found in the AAI have been found to overlap with those of the RSQ (Shaver, Belsky, & Brennan, 2000), the RSQ is a measure of romantic attachment while the AAI assesses an individual's state of mind and internal working models (De Haas, Bakermans-Kranenburg, & Van Ijzendoorn, 1994). Hence, the AAI would have met the needs of the present study better than the RSQ. However, the AAI is time consuming as the interview process takes between 45 minutes to an hour (Main & Goldwyn, 1991) without even taking into consideration the scoring process which would have been impractical and just impossible to perform due to the large number of participants that took part in the study.

Even though the use of SEM presents researchers with several advantages over other statistical methods, there is an important disadvantage that needs to be addressed as it is relevant to this study. Since SEM results are based on correlational data, assumptions of causality may not be established. As noted by Lei and Wu (2007), although the testing of causal hypotheses is well within the reach of SEM, the use of SEM to make causal claims is discouraged since even a well-fitting structural model "does not and cannot" prove causal relationships. Other added related issues affecting this study's ability to show causal relationships are the cross-sectional design of the study and the lack of longitudinal data. It is important to note however, that the term "cause/causation" in SEM is still not fully understood and there is still some disagreement among researchers regarding the full meaning of the term and how to recognise "causality" when and if one is presented with it (Markus, 2010).

Other potential issues often mentioned in the SEM literature include model identification, estimation methods, sample size and distributions. However, in this study steps were taken to overcome these potential problems as much as possible. First, concerning model identification, the process laid out in the section parameter identification and estimation (3.7.1.2) was followed in addition to suggestions by Schumacker and Lomax (2010), and specific rules for identification of structural equation models proposed by Bollen (1989). Second, regarding distribution and estimation methods in similar studies, even though multivariate normal distributions

of data are rare in SEM, normal distribution of data is often assumed, and therefore the Maximum Likelihood (ML) method to estimate parameters is typically used. Rather than assuming normality, the Kolmogorov-Smirnov and the Shapiro-Wilk tests of normality were performed in this study; the results indicated the data collected was not normally distributed. To add to that, as before noted, since the data collected for this study came only from liker-type measures, the data had to be treated as categorical. Thus, the WLSMV estimator method was used in all analyses performed for this study (please refer to section 3.6 for a detailed explanation and the reasoning for choosing the WLSMV over other estimator methods). And last, since a large sample of participants was recruited for this study, sample size was not an issue of concern (based on proposed “rules of thumb”) as most researchers suggest a sample size between 400 to 500 participants (Anderson & Gerbing, 1988; Bentler & Chou, 1987; Lohelin, 1992; Schumacker & Lomax, 2010) which is well below the 695 participants that took part in the study.

Another limitation is its generalizability as the sample of participants used for the study consisted of current college and university students only. Hence, the generalizability potential of this study to clinical populations is limited (see section 5.5.2). Related to the issue of generalizability is standardization. In the case of this study, it relates to the use of psychometric measures which were standardized to be used with specific populations (e.g. clinical populations, adults, children, etc) rather than with people in general. Specifically, since students were asked to participate in this study regardless of their nationality (as long as they were able to understand and communicate in English), the cultural differences between the participants were not taken into account as none of the measures used has been or could possibly be standardized to be used with a sample of participants from 65 different countries, not including the UK, many of which were not native English speakers. Berry, Poortinga, Segall and Dasen (2002) argued that measuring a construct across many cultures without adjusting for the effects of language and the influence of culture can lead to test bias (i.e. construct, method, and item bias). They noted that the perception and cultural conception of psychological processes and constructs of one culture cannot just be assumed to transfer to another culture, and noted that



exploration and research need to take place before any assumptions can be made. Regarding the present study, this is a limitation that may significantly affect measures like the CTQ and the PBI as many of the questions used to assess a construct (e.g. emotional childhood abuse in the CTQ) may be understood, perceived, and interpreted in different ways in the US (population for which the CTQ was originally standardized) than it would be in an Asian country like China, Japan, Indonesia or Taiwan.

Finally, since the features of BPD composite was constructed using the DSM 5 (alternative) classification of the disorder, mentioning the many criticisms about DSM classification cannot be avoided; particularly since the classification of BPD found on the DSM-IV remained unchanged in the DSM 5. However, since the BPD traits composite was based on features listed on the alternative diagnosis of BPD in section III, most of the criticisms of BPD classification do not apply in this case. On the contrary, as noted on the DSM 5, the thresholds specified in section III of the manual regarding BPD are based on empirical and clinical evidence. Hence, the many criticisms, some of which are the lack of emphasis on research based characteristics and the influence of external issues such policy making and politics, do not apply to section III.

## **5.7 Implications of Findings and Future Directions**

Despite the limitations of the present study, there are also important theoretical and clinical implications. Regarding metacognition, the results suggest that failures in the ability to recognize, attribute, and interpret the mental states of self and others have detrimental effects on the mental health and on the appropriate development of social, and interpersonal relationships of individuals who were victims of emotional, sexual, or physical abuse in childhood. This is important because since it is not possible to alter past childhood abuse, metacognitive mechanisms may be more amenable to change. Even though the effects of childhood abuse may be treated with one or various forms of empirically validated psychotherapeutic approaches (e.g. Dialectic Behavioral Therapy [DBT], Trauma-Focused Cognitive Behavioral Therapy [TF-CBT], Transference-Focused Psychotherapy [TFP], Cognitive

Processing Therapy [CPT], etc), and while most of these psychological therapies have a lot of factors in common (e.g. structure, theoretical base, length of treatment, etc; Bateman, 2005), not all of them place emphasis in metacognitive processes. Yet, the evidence from this study suggests that placing more emphasis on addressing failures in metacognition may have a significant and beneficial effect in the treatment of features of BPD.

The results also indicated that failures in metacognition may have a similar impact on individuals with adult insecure patterns of attachment. As in the case of childhood abuse, insecure patterns of attachment may be difficult to alter. Even though there is at least one empirically validated attachment-based psychotherapeutic approach that is used with adults (Emotionally Focused Therapy [EFT]), the main focus of EFT is on emotional rather than cognitive mechanisms (Johnson, 2009); consequently, working on metacognitive processes is not within the scope of EFT. Therefore, addressing failures in the metacognitive processes of individuals with insecure patterns of attachment could be important as it may eventually lead to the amelioration of features associated with BPD.

Borderline Personality Disorder is often associated with childhood sexual abuse and with patterns of insecure attachment. Hence, it is important to point to the fact that the results showed that the relationship between childhood sexual abuse and features associated with BPD traits was significant. The results also showed that this relationship was mediated by metacognition. Likewise, the relationship between adult insecure pattern of attachment and features associated with BPD traits was significant; and this relationship was mediated by metacognition as well. Hence, the results of this study provide support to both associations.

In terms of emotion regulation suppression, the results suggest that the inhibition of emotions and accompanying behaviour during perceived emotionally charged situations have an adverse effect on the mental, social, and personal well-being of individuals who were sexually or physically abuse in childhood. As in the case of metacognition, patterns of emotion regulation suppression may be open to alteration

which is not possible with past childhood abuse. Although, it must be noted that while it has been postulated that emotion regulation strategies can be altered in psychotherapy, there is still not sufficient empirical evidence to corroborate this hypothesis (Rottenberg & Gross, 2007). In consequence, there are no empirically validated psychotherapeutic approaches that fully and specifically address problems with emotion regulation suppression. Hence, the inference here is that there should be more emphasis on researching changes on emotion regulation and strategies associated with these changes so a sensible psychotherapeutic treatment may be developed in the future.

Regarding the lack of emotion regulation reappraisal, the results suggest that the inability to make cognitive changes involved in the assessment and re-evaluation of potential emotionally charged situations have a detrimental impact at the personal, emotional, psychological, and social levels of individuals who experienced sexual abuse in childhood. Emotion regulation reappraisal is considered a more adaptive type of emotion regulation, one that is considered (in theory) an outcome of empirically validated psychotherapeutic approaches (Rottenberg & Gross, 2007). Therefore, if more emphasis was placed in teaching and improving emotion reappraisal strategies, perhaps a significant decrease in the number of BPD features would be observed.

The results of this study also showed that emotion regulation suppression does not play a role in the relationship between adult insecure attachment patterns and features associated with BPD; but the lack of emotion regulation reappraisal does. In addition, the results also indicated that a direct relationship between adult insecure attachment and BPD traits does exist. Given the emphasis of attachment theory on emotion, this is a significant result which indicates that, with respect to patterns of adult insecure attachment and its relationship to features of BPD, inhibition of emotions may not play as an important role as the ability (or lack of) to make cognitive changes geared towards the re-evaluation of significant emotional situations. Hence, once again, the role of cognitions appears to be very relevant even in situations involving the regulation of emotions.

Regarding childhood maltreatment, when the results involving all the different forms of childhood abuse are observed as a whole, even though sexual abuse had a direct impact on the development of features associated with BPD, it was also mediated by all three constructs hypothesized in this study. Physical abuse on the other hand, was mediated by metacognition and emotion regulation suppression, but not by the lack of emotion regulation reappraisal; while emotional abuse was only mediated by metacognition. This may be an indication that the effects of childhood sexual abuse are more complex, hence more difficult to fully understand and to treat than the effects of childhood physical abuse and emotional abuse. In addition, while these findings are supportive of the literature as a whole, the results do not support recent studies that suggest that it is emotional abuse or physical abuse rather than sexual abuse what has the most impact on the development of BPD features. On the contrary, previous studies that maintain the long-held belief that childhood sexual abuse is the most relevant form of abuse, as far as BPD pathology is concerned, were supported by the results obtained here.

Regarding neglect, since there is enough evidence to suggest that adverse childhood experiences have a detrimental effect on mental health, the negative effects of neglect can hardly be ignored. Despite the issues surrounding the lack of a working definition which greatly hinders research, neglect has been hypothesized to play a role in the development of mental disorders and BPD. Therefore, it is important to redefine our understanding of neglect and to reach a consensus on a working definition so that associations between neglect and mental disorders, including BPD, can be fully investigated in future research.

In the cases of parental bonding overprotection and parental bonding indifference, the information obtained from this study is limited. None of the proposed mediators used was related to either form of parental bonding. Nevertheless, the results point to a relationship between both forms of parental bonding and features associated with BPD which suggest that being raised by a mother who is indifferent or a mother characterized as overprotective may contribute to the development of BPD traits. However, without a more specific conceptualization of the term parental bonding,

proposing broader generalizations or making assumptions would not be appropriate. In addition, without a clear definition of the construct, it is difficult to separate what is accounted by patterns of insecure attachment, and what is unique only to parental bonding in relationship to traits associated with BPD.

Taking into consideration that the population included in this study came from various colleges and universities in Edinburgh, the results could reasonable be applicable to the student population of Edinburgh that falls within these parameters. As already noted, even though cross-sectional studies do not allow for cause and effect inferences, such studies still provide important practical information. In the case of this study and regarding the non-clinical student population that took part, important inferences can be made. For instance, the results suggest that regardless of racial/ethnic background or nationality, childhood abuse (in all three different forms) is a problem that needs to be addressed. Hence, clinicians and counsellors who work at university clinics and student counselling services should become comfortable with screening and discussing childhood abuse in a culturally competent manner. In addition, programs run by universities and by student services could be developed to educate students on the lasting consequences of childhood abuse and to encourage those who need it to seek help. Such programs and services could reach students, who would otherwise go undetected, opening the possibility for improvement in their everyday interaction with peers and faculty, and even the prospect of academic improvement.

Similarly, taking into consideration that mentalization and metacognitive skills training programmes are available for mental health professionals and considering the results that point to the mediating effects of metacognition, clinicians and counsellors working with students could be trained to provide more effective treatments to students with a background of childhood maltreatment and/or attachment difficulties. At the very least, students presenting such difficulties should be readily recognized and referred for further psychological treatment. If some of these changes could be achieved, the lives of students and their educational experience could be greatly improved.

## **5.8 Conclusion**

Studies investigating relationships associated with BPD have generally relied on the use of clinical populations. Consequently, the understanding of vulnerabilities and fundamental processes that may contribute to the development and maintenance of BPD is still limited. Despite extensive information regarding the relationship between childhood maltreatment and insecure attachment with features associated with BPD, little is known about the underlying mechanisms through which this happens as evidenced by the systematic review part of this thesis. This study was an initial attempt to change that trend.

The main findings of the present thesis were that failures in metacognition play a significant and detrimental role in functional and psychological aspects associated with BPD in individuals with a history of childhood abuse and also in individuals with patterns of adult insecure attachment. In addition, emotion regulation suppression and the lack of emotion regulation reappraisal were also found to play a similar and significant role. The influence of emotion regulation suppression however was limited to individuals with a history of childhood sexual and physical abuse; while the lack of emotion regulation reappraisal was limited to individuals with a history of childhood sexual abuse and individuals with patterns of adult insecure attachment.

Overall, the results of this study were supportive of previous theory and research that argued that a history of childhood abuse increases the likelihood of lifetime problems associated with BPD and also with a wide range of psychological problems. In the same manner, the results also supported the literature pointing to an association between patterns of adult insecure attachment and a history of social, psychological, and interpersonal problems. Most significantly however, important information regarding internal mechanisms of features associated with BPD was found. These findings are important because of the significant implications to the treatment of BPD. While the traumatic experience of past childhood abuse and, to lesser degree, deep seeded patterns of insecure attachment may prove difficult to change, metacognition and the regulation of emotion may be more amenable to change.

Hence, this opens the possibility of improving existing treatments and developing new psychotherapeutic approaches to the treatment of BPD. In turn, this may eventually lead to significant changes in the way BPD is treated from a clinical point of view, and perhaps to major changes in the classification and overall perception of BPD.

However, in order to achieve such knowledge and understanding significant changes in the way mental disorders are researched need to take place. The reasons for using only clinical populations in research are understandable since much of the clinical research today concentrates in treatment development and outcome. Nonetheless, an essential step in managing all different aspects of a mental disorder, even in the absence of an effective treatment, is to identify risk factors and the underlying processes that drive and maintain the disorder. While this may prove extremely difficult to do by using clinical populations, using non-clinical populations may be more appropriate. Hence in order to advance clinical research of mental disorders, including BPD, it is important to encourage clinical researches to widen their field of study to include non-clinical populations and for editors in peer reviewed journals to be more open to the publication of such studies.

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# 7 APPENDICES

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## **Appendix 1:** Systematic review search terms and syntax

In order to get better results in the data base searches, truncation symbols (\*) and (\$) were used to truncate search terms. Truncation enables different forms of a word to be searched for simultaneously, and will increase the number of search results found.

The following search terms were used:


1. Childhood maltreatment and (\$) borderline personality disorder <sup>[1]</sup>
2. Childhood abuse and (\$) borderline personality disorder <sup>[1]</sup>
3. Childhood maltreatment and (\$) mediator <sup>[2]</sup>
4. Childhood abuse and (\$) mediator <sup>[2]</sup>
5. Childhood maltreatment and (\$) moderator <sup>[2]</sup>
6. Childhood abuse and (\$) moderator <sup>[2]</sup>
7. Borderline Personality Disorder and (\$) mediator <sup>[2]</sup>
8. Borderline Personality Disorder and (\$) moderator <sup>[2]</sup>
9. Abuse \$ borderline personality and (\$) mediator <sup>[2]</sup>
10. Abuse \$ borderline personality and (\$) moderator <sup>[2]</sup>
11. Attachment and (\$) borderline personality disorder <sup>[1]</sup>
12. Attachment and (\$) mediator <sup>[2]</sup>
13. Attachment and (\$) moderator <sup>[2]</sup>
14. Attachment \$ borderline personality and (\$) mediator <sup>[2]</sup>
15. Attachment \$ borderline personality and (\$) moderator <sup>[2]</sup>
16. Emotion regulation and borderline personality disorder <sup>[1]</sup>
17. Affect regulation and borderline personality disorder <sup>[1]</sup>
18. Emotion dysregulation and borderline personality disorder <sup>[1]</sup>
19. Affect dysregulation and borderline personality disorder <sup>[1]</sup>
20. Attachment \$ emotion regulation and (\$) mediator <sup>[2]</sup>
21. Attachment \$ emotion regulation and (\$) moderator <sup>[2]</sup>
22. Attachment \$ emotion dysregulation and (\$) mediator <sup>[2]</sup>
23. Attachment \$ emotion dysregulation and (\$) moderator <sup>[2]</sup>

24. Attachment \$ Affect regulation and (\$) mediator <sup>[2]</sup>
25. Attachment \$ Affect regulation and (\$) moderator <sup>[2]</sup>
26. Attachment \$ Affect dysregulation and (\$) mediator <sup>[2]</sup>
27. Attachment \$ Affect dysregulation and (\$) moderator <sup>[2]</sup>
28. Mentalization and personality disorder <sup>[1]</sup>
29. Mentalization and borderline personality <sup>[1]</sup>
30. Metacognition and personality disorder <sup>[1]</sup>
31. Metacognition and borderline personality <sup>[1]</sup>
32. Theory of mind and personality disorder <sup>[1]</sup>
33. Theory of mind and borderline personality <sup>[1]</sup>
34. Theory of mind and personality disorder <sup>[2]</sup>
35. Theory of mind and borderline personality <sup>[2]</sup>
36. Theory of mind\* and personality disorder <sup>[2]</sup>
37. Theory of mind\* and borderline personality <sup>[2]</sup>
38. Theory of mind\* and personality disorder <sup>[1]</sup>
39. Theory of mind\* and borderline personality <sup>[1]</sup>
40. Impulsivity and personality disorder <sup>[1]</sup>
41. Impulsivity and borderline personality <sup>[1]</sup>
42. Hyperactivity and personality disorder <sup>[1]</sup>
43. Hyperactivity and borderline personality <sup>[1]</sup>
44. Thought suppression\* and borderline personality <sup>[1]</sup>
45. Thought suppression\* and mediator <sup>[2]</sup>
46. Thought suppression\* and moderator <sup>[2]</sup>

<sup>[1]</sup> All fields (advanced search)-(term)-all years-all sources (include journals and books)-all fields of study.

<sup>[2]</sup> Abstract, Title, Keywords (advanced search)-(term)- *and* Abstract, Title, Keywords (advanced search)-(term)-all years-all sources (include journals only)-all fields of study.

## Appendix 2: SIGN's methodology checklist for cohort studies

 <b>SIGN</b>		<b>Methodology Checklist 3: Cohort studies</b>	
Study identification <i>(Include author, title, year of publication, journal title, pages)</i>			
Guideline topic:		Key Question No:	Reviewer:
<b>Before</b> completing this checklist, consider: <ol style="list-style-type: none"> <li>1. Is the paper really a cohort study? If in doubt, check the study design algorithm available from SIGN and make sure you have the correct checklist.</li> <li>2. Is the paper relevant to key question? Analyse using PICO (Patient or Population Intervention Comparison Outcome). IF NO REJECT (give reason below). IF YES complete the checklist.</li> </ol>			
Reason for rejection: 1. Paper not relevant to key question 2. Other reason <input type="checkbox"/> (please specify): <b>Please note that a retrospective study (ie a database or chart study) cannot be rated higher than +.</b>			
<b>8 Section 1: Internal validity</b>			
<i>In a well conducted cohort study:</i>		<b>9 Does this study do it?</b>	
1.1	The study addresses an appropriate and clearly focused question. <sup>1</sup>	Yes <input type="checkbox"/>	No <input type="checkbox"/> Can't say <input type="checkbox"/>
Selection of subjects			



1.2	The two groups being studied are selected from source populations that are comparable in all respects other than the factor under investigation. <sup>2</sup>	Yes <input type="checkbox"/>	No <input type="checkbox"/>
		Can't say <input type="checkbox"/>	Does not apply <input type="checkbox"/>
1.3	The study indicates how many of the people asked to take part did so, in each of the groups being studied. <sup>3</sup>	Yes <input type="checkbox"/>	No <input type="checkbox"/>
			Does not apply <input type="checkbox"/>
1.4	<del>The likelihood that some eligible subjects might have the outcome at the time of enrolment is assessed and taken into account in the analysis.<sup>i</sup> (N/A)</del>	Yes <input type="checkbox"/>	No <input type="checkbox"/>
		Can't say <input type="checkbox"/>	Does not apply <input type="checkbox"/>
1.5	What percentage of individuals or clusters recruited into each arm of the study dropped out before the study was completed. <sup>ii</sup>		

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1.6	Comparison is made between full participants and those lost to follow up, by exposure status. <sup>iii</sup>	Yes <input type="checkbox"/> No <input type="checkbox"/> Can't say <input type="checkbox"/> Does not apply <input type="checkbox"/>
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ASSESSMENT		
1.7	The outcomes are clearly defined. <sup>iv</sup>	Yes <input type="checkbox"/> No <input type="checkbox"/> Can't say <input type="checkbox"/>
<del>1.8</del>	<del>The assessment of outcome is made blind to exposure status. If the study is retrospective this may not be applicable.*-(N/A)</del>	Yes <input type="checkbox"/> No <input type="checkbox"/> Can't say <input type="checkbox"/> Does not apply <input type="checkbox"/>
<del>1.9</del>	<del>Where blinding was not possible, there is some recognition that knowledge of exposure status could have influenced the assessment of outcome.<sup>vi</sup>-(N/A)</del>	Yes <input type="checkbox"/> No <input type="checkbox"/> Can't say <input type="checkbox"/> Does not apply <input type="checkbox"/>
1.10	The method of assessment of exposure is reliable. <sup>vii</sup>	Yes <input type="checkbox"/> No <input type="checkbox"/> Can't say <input type="checkbox"/>
1.11	Evidence from other sources is used to demonstrate that the method of outcome assessment is valid and reliable. <sup>viii</sup>	Yes <input type="checkbox"/> No <input type="checkbox"/> Can't say <input type="checkbox"/> Does not apply <input type="checkbox"/>

1.12	Exposure level or prognostic factor is assessed more than once. <sup>ix</sup> (N/A)	Yes <input type="checkbox"/> Can't say <input type="checkbox"/>	No <input type="checkbox"/> Does not apply <input type="checkbox"/>
CONFOUNDING			
1.13	The main potential confounders are identified and taken into account in the design and analysis. <sup>x</sup>	Yes <input type="checkbox"/> Can't say <input type="checkbox"/>	No <input type="checkbox"/>
STATISTICAL ANALYSIS			
1.14	Have confidence intervals been provided? <sup>xi</sup>		Yes <input type="checkbox"/> No <input type="checkbox"/>
Section 2: OVERALL ASSESSMENT OF THE STUDY			
2.1	How well was the study done to minimise the risk of bias or confounding? <sup>xii</sup>	High quality (++) <input type="checkbox"/> Acceptable (+) <input type="checkbox"/> Unacceptable – reject 0	
2.2	Taking into account clinical considerations, your evaluation of the methodology used, and the statistical power of the study, how strong do you think the association between exposure and outcome is?		
2.3	Are the results of this study directly applicable to the patient group targeted in this guideline?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
2.4	<b>Notes.</b> Summarise the authors conclusions. Add any comments on your own assessment of the study, and the extent to which it answers your question and mention any areas of uncertainty raised above.		

- 
- <sup>1</sup> Unless a clear and well defined question is specified in the report of the review, it will be difficult to assess how well it has met its objectives or how relevant it is to the question you are trying to answer on the basis of the conclusions.
- <sup>1</sup> This relates to **selection bias**.<sup>\*</sup> It is important that the two groups selected for comparison are as similar as possible in all characteristics except for their exposure status, or the presence of specific prognostic factors or prognostic markers relevant to the study in question.
- <sup>1</sup> This relates to **selection bias**.<sup>\*</sup> The participation rate is defined as the number of study participants divided by the number of eligible subjects, and should be calculated separately for each branch of the study. A large difference in participation rate between the two arms of the study indicates that a significant degree of **selection bias**<sup>\*</sup> may be present, and the study results should be treated with considerable caution.
- <sup>1</sup> If some of the eligible subjects, particularly those in the unexposed group, already have the outcome at the start of the trial the final result will be subject to **performance bias**.<sup>\*</sup> A well conducted study will attempt to estimate the likelihood of this occurring, and take it into account in the analysis through the use of sensitivity studies or other methods.
- <sup>1</sup> This question relates to the risk of **attrition bias**.<sup>\*</sup> The number of patients that drop out of a study should give concern if the number is very high. Conventionally, a 20% drop out rate is regarded as acceptable, but in observational studies conducted over a lengthy period of time a higher drop out rate is to be expected. A decision on whether to downgrade or reject a study because of a high drop out rate is a matter of judgement based on the reasons why people dropped out, and whether drop out rates were comparable in the exposed and unexposed groups. Reporting of efforts to follow up participants that dropped out may be regarded as an indicator of a well conducted study.
- <sup>1</sup> For valid study results, it is essential that the study participants are truly representative of the source population. It is always possible that participants who dropped out of the study will differ in some significant way from those who remained part of the study throughout. A well conducted study will attempt to identify any such differences between full and partial participants in both the exposed and unexposed groups. This relates to the risk of **attrition bias**.<sup>\*</sup> Any unexplained differences should lead to the study results being treated with caution.
- <sup>1</sup> This relates to the risk of **detection bias**.<sup>\*</sup> Once enrolled in the study, participants should be followed until specified end points or outcomes are reached. In a study of the effect of exercise on the death rates from heart disease in middle aged men, for example, participants might be followed up until death, or until reaching a predefined age. **If outcomes and the criteria used for measuring them are not clearly defined, the study should be rejected.**
- <sup>1</sup> This relates to the risk of **detection bias**.<sup>\*</sup> If the assessor is blinded to which participants received the exposure, and which did not, the prospects of unbiased results are significantly increased. Studies in which this is done should be rated more highly than those where it is not done, or not done adequately.

- <sup>1</sup> This relates to the risk of **detection bias**.<sup>\*</sup> Blinding is not possible in many cohort studies. In order to assess the extent of any bias that may be present, it may be helpful to compare process measures used on the participant groups - e.g. frequency of observations, who carried out the observations, the degree of detail and completeness of observations. If these process measures are comparable between the groups, the results may be regarded with more confidence.
- <sup>1</sup> This relates to the risk of **detection bias**.<sup>\*</sup> A well conducted study should indicate how the degree of exposure or presence of prognostic factors or markers was assessed. Whatever measures are used must be sufficient to establish clearly that participants have or have not received the exposure under investigation and the extent of such exposure, or that they do or do not possess a particular prognostic marker or factor. Clearly described, reliable measures should increase the confidence in the quality of the study
- <sup>1</sup> This relates to the risk of **detection bias**.<sup>\*</sup> The primary outcome measures used should be clearly stated in the study. **If the outcome measures are not stated, or the study bases its main conclusions on secondary outcomes, the study should be rejected.** Where outcome measures require any degree of subjectivity, some evidence should be provided that the measures used are reliable and have been validated prior to their use in the study.
- <sup>1</sup> This relates to the risk of **detection bias**.<sup>\*</sup> Confidence in data quality should be increased if exposure level is measured more than once in the course of the study. Independent assessment by more than one investigator is preferable.
- <sup>1</sup> Confounding is the distortion of a link between exposure and outcome by another factor that is associated with both exposure and outcome. The possible presence of confounding factors is one of the principal reasons why observational studies are not more highly rated as a source of evidence. The report of the study should indicate which potential confounders have been considered, and how they have been assessed or allowed for in the analysis. Clinical judgement should be applied to consider whether all likely confounders have been considered. If the measures used to address confounding are considered inadequate, the study should be downgraded or rejected, depending on how serious the risk of confounding is considered to be.  
**A study that does not address the possibility of confounding should be rejected.**
- <sup>1</sup> Confidence limits are the preferred method for indicating the precision of statistical results, and can be used to differentiate between an inconclusive study and a study that shows no effect. Studies that report a single value with no assessment of precision should be treated with extreme caution.
- <sup>1</sup> Rate the overall methodological quality of the study, using the following as a guide: **High quality** (++) : Majority of criteria met. Little or no risk of bias. Results unlikely to be changed by further research. **Acceptable** (+) : Most criteria met. Some flaws in the study with an associated risk of bias, Conclusions may change in the light of further studies. **Low quality** (0) : Either most criteria not met, or significant flaws relating to key aspects of study design. Conclusions likely to change in the light of further studies.

### **Appendix 3:** Newcastle-Ottawa Scale adapted for cross-sectional studies

#### **Selection:** (Maximum 5 stars)

##### 1) Representativeness of the sample:

- a) Truly representative of the average in the target population. \* (all subjects or random sampling)
- b) Somewhat representative of the average in the target population. \* (non-random sampling)
- c) Selected group of users.
- d) No description of the sampling strategy.

##### 2) Sample size:

- a) Justified and satisfactory. \*
- b) Not justified.

##### 3) Non-respondents:

- a) Comparability between respondents and non-respondents characteristics is established, and the response rate is satisfactory. \*
- b) The response rate is unsatisfactory, or the comparability between respondents and non-respondents is unsatisfactory.
- c) No description of the response rate or the characteristics of the responders and the non-responders.

##### 4) Ascertainment of the exposure (risk factor):

- a) Validated measurement tool. \*\*
- b) Non-validated measurement tool, but the tool is available or described.\*
- c) No description of the measurement tool.

#### **Comparability:** (Maximum 2 stars)

- 1) The subjects in different outcome groups are comparable, based on the study design or analysis. Confounding factors are controlled.

- a) The study controls for the most important factor (select one). \*
- b) The study control for any additional factor. \*

**Outcome:** (Maximum 3 stars)

1) Assessment of the outcome:

- a) Independent blind assessment. \*\*
- b) Record linkage. \*\*
- c) Self report. \*
- d) No description.

2) Statistical test:

- a) The statistical test used to analyze the data is clearly described and appropriate, and the measurement of the association is presented, including confidence intervals and the probability level (p value). \*
- b) The statistical test is not appropriate, not described or incomplete.

This scale has been adapted from the Newcastle-Ottawa Quality Assessment Scale for cohort studies to perform a quality assessment of cross-sectional studies for the systematic review, “Are Healthcare Workers’ Intentions to Vaccinate Related to their Knowledge, Beliefs and Attitudes? A Systematic Review”.

We have not selected one factor that is the most important for comparability, because the variables are not the same in each study. Thus, the principal factor should be identified for each study.

In our scale, we have specifically assigned one star for self-reported outcomes, because our study measures the intention to vaccinate. Two stars are given to the studies that assess the outcome with independent blind observers or with vaccination records, because these methods measure the practice of vaccination, which is the result of true intention.

Analogue Investigation Survey



Personality Makes Us who we Are

It influences nearly every aspect of our lives, from what we choose to do for a living to how we interact with our families to our choices of friends and romantic partners.

But

What factors influence our personality?

Can we change our personalities?

Do our overall traits remain constant throughout life?

These are questions that remain unanswered and are still the focus of research

[Continue >](#)



## Analogue Investigation Survey



Page 4 of 20

### CONSENT PAGE

Please read the following statements and check the box to indicate that you agree:

1. I confirm that I have read and I understand the information sheet presented to me in the previous screen for the above study.

- ☐ Yes  
☐ No

2. I have had the opportunity to consider the information. If you have any questions that were not resolved, please contact the researcher before continuing.

- ☐ Yes  
☐ No

3. I understand that I may ask further questions at any time.

- ☐ Yes  
☐ No

4. I also understand that I am free to withdraw from the study at any time, or to decline to answer any particular questions in the study.

- ☐ Yes  
☐ No

5. I agree to provide information to the researchers under the conditions of confidentiality set out on the participant information sheet.

- ☐ Yes  
☐ No

6. I wish to participate in this study under the conditions set out in the Participant Information Sheet.

- ☐ Yes  
☐ No

7. I consent to the information collected for in this study to be used in this study under the conditions set out on the participant information sheet.

- ☐ Yes  
☐ No

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## Analogue Investigation Survey



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### DEMOGRAPHICS

Please fill out this page with some details that let us know a little about you.

8. What is your gender?

- ☐ Male  
☐ Female

9. How old are you?

10. What is your racial/ethnic background?

- ☐ Caucasian  
☐ Black  
☐ Asian  
☐ Mixed  
☐ Other

11. What is your country of origin?

**Please press "continue" to start the survey**

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## Analogue Investigation Survey



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## EMOTION REGULATION QUESTIONNAIRE (ERQ)

## Emotion Regulation Questionnaire

We would like to ask you some questions about your emotional life, in particular, how you control (that is, regulate and manage) your emotions. The questions below involve two distinct aspects of your emotional life. One is your emotional experience, or what you feel like inside. The other is your emotional expression, or how you show your emotions in the way you talk, gesture, or behave. Although some of the following questions may seem similar to one another, they differ in important ways. For each item, please tick the circle corresponding to the answer that fits best.

12. When I want to feel more positive emotion (such as joy or amusement), I change what I'm thinking about

☐ Strongly disagree ☐ Moderately disagree ☐ Mildly disagree ☐ Neutral ☐ Mildly agree ☐ Moderately agree ☐ Strongly agree

13. I keep my emotions to myself

☐ Strongly disagree ☐ Moderately disagree ☐ Mildly disagree ☐ Neutral ☐ Mildly agree ☐ Moderately agree ☐ Strongly agree

14. When I want to feel less negative emotion (such as sadness or anger), I change what I'm thinking about

☐ Strongly disagree ☐ Moderately disagree ☐ Mildly disagree ☐ Neutral ☐ Mildly agree ☐ Moderately agree ☐ Strongly agree

15. When I am feeling positive emotions, I am careful not to express them

☐ Strongly disagree ☐ Moderately disagree ☐ Mildly disagree ☐ Neutral ☐ Mildly agree ☐ Moderately agree ☐ Strongly agree

16. When I'm faced with a stressful situation, I make myself think about it in a way that helps me stay calm

☐ Strongly disagree ☐ Moderately disagree ☐ Mildly disagree ☐ Neutral ☐ Mildly agree ☐ Moderately agree ☐ Strongly agree

17. I control my emotions by not expressing them

☐ Strongly disagree ☐ Moderately disagree ☐ Mildly disagree ☐ Neutral ☐ Mildly agree ☐ Moderately agree ☐ Strongly agree

18. When I want to feel more positive emotion, I change the way I'm thinking about the situation

☐ Strongly disagree ☐ Moderately disagree ☐ Mildly disagree ☐ Neutral ☐ Mildly agree ☐ Moderately agree ☐ Strongly agree

19. I control my emotions by changing the way I think about the situation I'm in

☐ Strongly disagree ☐ Moderately disagree ☐ Mildly disagree ☐ Neutral ☐ Mildly agree ☐ Moderately agree ☐ Strongly agree

20. When I am feeling negative emotions, I make sure not to express them

☐ Strongly disagree ☐ Moderately disagree ☐ Mildly disagree ☐ Neutral ☐ Mildly agree ☐ Moderately agree

agree ☐ Strongly agree

**21.** When I want to feel less negative emotion, I change the way I'm thinking about the situation

☐ Strongly disagree ☐ Moderately disagree ☐ Mildly disagree ☐ Neutral ☐ Mildly agree ☐ Moderately agree ☐ Strongly agree

**Continue >**

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## THE HOSPITAL ANXIETY AND DEPRESSION SCALE (HADS)

## Hospital Anxiety and Depression Scale

Read each item and choose the answer that comes closest to how you have been feeling in the past week.

Don't take long over your replies; your immediate reaction to each item will probably be more accurate than a long thought-out response.

22. I feel tense or 'wound up'

☐ Most of the time ☐ A lot of the time ☐ From time to time, Occasionally ☐ Not at all

23. I still enjoy the things I used to enjoy

☐ Definitely as much ☐ Not quite so much ☐ Only a little ☐ Hardly at all

24. I get a sort of frightened feeling as if something awful is about to happen

☐ Very definitely and quite badly ☐ Yes, but not too badly ☐ A little, but it doesn't worry me ☐ Not at all

25. I can laugh and see the funny side of things

☐ As much as I always could ☐ Not quite so much now ☐ Definitely not so much now ☐ Not at all

26. Worrying thoughts go through my mind

☐ A great deal of the time ☐ A lot of the time ☐ From time to time, but not too often ☐ Only occasionally

27. I feel cheerful

☐ Not at all ☐ Not often ☐ Sometimes ☐ Most of the time

28. I can sit at ease and feel relaxed

☐ Definitely ☐ Usually ☐ Not Often ☐ Not at all

29. I feel as if I am slowed down

☐ Nearly all the time ☐ Very often ☐ Sometimes ☐ Not at all

30. I get a sort of frightened feeling like 'butterflies' in the stomach

☐ Not at all ☐ Occasionally ☐ Quite Often ☐ Very Often

31. I have lost interest in my appearance

☐ Definitely ☐ I don't take as much care as I should ☐ I may not take quite as much care ☐ I take just as much care as ever

32. I feel restless as I have to be on the move

☐ Very much indeed ☐ Quite a lot ☐ Not very much ☐ Not at all

33. I look forward with enjoyment to things

☐ As much as I ever did ☐ Rather less than I used to ☐ Definitely less than I used to ☐ Hardly at all

**34.** I get sudden feelings of panic

☐ Very often indeed ☐ Quite often ☐ Not very often ☐ Not at all

**35.** I can enjoy a good book or radio or TV program

☐ Often ☐ Sometimes ☐ Not often ☐ Very seldom

**Continue >**

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Can Birth Order Influence your Personality?

While we still do not know with certainty, recent studies have found that birth order and family size may influence our choices of friends, romantic partners, and even career choice.

It is important to note however that for every study making the above stated claims, there are many claiming the opposite.

This is a vast area of research! A researcher in the area found 65,000 scholarly articles about birth order indexed by Google Scholar.

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## Analogue Investigation Survey



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## METACOGNITIONS QUESTIONNAIRE 30 (MCQ-30)

## Metacognitions Questionnaire 30

This questionnaire is concerned with beliefs people have about their thinking. Listed below are a number of beliefs that people have expressed.

Please read each item and say how much you generally agree with it by ticking the circle corresponding to the answer that fits best. Please respond to all the items, there are no right or wrong answers.

36. Worrying helps me to avoid problems in the future  
☐ Do not agree ☐ Agree slightly ☐ Agree moderately ☐ Agree very much
37. My worrying is dangerous for me  
☐ Do not agree ☐ Agree slightly ☐ Agree moderately ☐ Agree very much
38. I think a lot about my thoughts  
☐ Do not agree ☐ Agree slightly ☐ Agree moderately ☐ Agree very much
39. I could make myself sick with worrying  
☐ Do not agree ☐ Agree slightly ☐ Agree moderately ☐ Agree very much
40. I am aware of the way my mind works when I am thinking through a problem  
☐ Do not agree ☐ Agree slightly ☐ Agree moderately ☐ Agree very much
41. If I did not control a worrying thought, and then it happened, it would be my fault  
☐ Do not agree ☐ Agree slightly ☐ Agree moderately ☐ Agree very much
42. I need to worry in order to remain organized  
☐ Do not agree ☐ Agree slightly ☐ Agree moderately ☐ Agree very much
43. I have little confidence in my memory for words and names  
☐ Do not agree ☐ Agree slightly ☐ Agree moderately ☐ Agree very much
44. My worrying thoughts persist, no matter how I try to stop them  
☐ Do not agree ☐ Agree slightly ☐ Agree moderately ☐ Agree very much
45. I cannot ignore my worrying thoughts  
☐ Do not agree ☐ Agree slightly ☐ Agree moderately ☐ Agree very much
46. I monitor my thoughts  
☐ Do not agree ☐ Agree slightly ☐ Agree moderately ☐ Agree very much
47. I should be in control of my thoughts all of the time  
☐ Do not agree ☐ Agree slightly ☐ Agree moderately ☐ Agree very much



48. My memory can mislead me at times  
☐ Do not agree ☐ Agree slightly ☐ Agree moderately ☐ Agree very much
49. My worrying could make me go mad  
☐ Do not agree ☐ Agree slightly ☐ Agree moderately ☐ Agree very much
50. I am constantly aware of my thinking  
☐ Do not agree ☐ Agree slightly ☐ Agree moderately ☐ Agree very much
51. I have a poor memory  
☐ Do not agree ☐ Agree slightly ☐ Agree moderately ☐ Agree very much
52. I pay close attention to the way my mind works  
☐ Do not agree ☐ Agree slightly ☐ Agree moderately ☐ Agree very much
53. Worrying helps me cope  
☐ Do not agree ☐ Agree slightly ☐ Agree moderately ☐ Agree very much
54. Not being able to control my thoughts is a sign of weakness  
☐ Do not agree ☐ Agree slightly ☐ Agree moderately ☐ Agree very much
55. When I start worrying, I cannot stop  
☐ Do not agree ☐ Agree slightly ☐ Agree moderately ☐ Agree very much
56. I will be punished for not controlling certain thoughts  
☐ Do not agree ☐ Agree slightly ☐ Agree moderately ☐ Agree very much
57. Worrying helps me to solve problems  
☐ Do not agree ☐ Agree slightly ☐ Agree moderately ☐ Agree very much
58. I have little confidence in my memory for places  
☐ Do not agree ☐ Agree slightly ☐ Agree moderately ☐ Agree very much
59. It is bad to think certain thoughts  
☐ Do not agree ☐ Agree slightly ☐ Agree moderately ☐ Agree very much
60. I do not trust my memory  
☐ Do not agree ☐ Agree slightly ☐ Agree moderately ☐ Agree very much
61. If I could not control my thoughts, I would not be able to function  
☐ Do not agree ☐ Agree slightly ☐ Agree moderately ☐ Agree very much
62. I need to worry in order to work well  
☐ Do not agree ☐ Agree slightly ☐ Agree moderately ☐ Agree very much
63. I have little confidence in my memory for actions  
☐ Do not agree ☐ Agree slightly ☐ Agree moderately ☐ Agree very much
64. I constantly examine my thoughts

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☐ Do not agree ☐ Agree slightly ☐ Agree moderately ☐ Agree very much

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Does our Personality Change Over Time?  
According to long-term studies of personality, there is no evidence that our personalities change over time and most core parts of personality remain stable throughout life.

Three aspects that do tend to change as we age are anxiety levels, friendliness and eagerness for novel experiences.

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### PARENTAL BONDING INSTRUMENT (PBI)

#### Parental Bonding Instrument (Mother Form)

This questionnaire lists various attitudes and behaviours of parents. As you remember your MOTHER in your first 16 years, would you place a tick in the most appropriate box next to each question.

65. Spoke to me in a warm and friendly voice

☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely

66. Did not help me as much as I needed

☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely

67. Let me do those things I liked doing

☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely

68. Seemed emotionally cold to me

☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely

69. Appeared to understand my problems and worries

☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely

70. Was affectionate to me

☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely

71. Liked me to make my own decisions

☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely

72. Did not want me to grow up

☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely

73. Tried to control everything I did

☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely

74. Invaded my privacy

☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely

75. Enjoyed talking things over with me

☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely

76. Frequently smiled at me

☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely

77. Tended to baby me

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- ☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely
78. Did not seem to understand what I needed or wanted  
☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely
79. Let me decide things for myself  
☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely
80. Made me feel I wasn't wanted  
☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely
81. Could make me feel better when I was upset  
☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely
82. Did not talk with me very much  
☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely
83. Tried to make me feel dependent on her/him  
☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely
84. Felt I could not look after myself unless she/he was around  
☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely
85. Gave me as much freedom as I wanted  
☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely
86. Let me go out as often as I wanted  
☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely
87. Was overprotective of me  
☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely
88. Did not praise me  
☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely
89. Let me dress in any way I pleased  
☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely

#### PARENTAL BONDING INSTRUMENT (Father Form)

This questionnaire lists various attitudes and behaviours of parents. As you remember your FATHER in your first 16 years, would you place a tick in the most appropriate box next to each question.

90. Spoke to me in a warm and friendly voice  
☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely
91. Did not help me as much as I needed  
☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely
92. Let me do those things I liked doing

- ☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely
93. Seemed emotionally cold to me  
☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely
94. Appeared to understand my problems and worries  
☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely
95. Was affectionate to me  
☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely
96. Liked me to make my own decisions  
☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely
97. Did not want me to grow up  
☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely
98. Tried to control everything I did  
☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely
99. Invaded my privacy  
☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely
100. Enjoyed talking things over with me  
☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely
101. Frequently smiled at me  
☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely
102. Tended to baby me  
☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely
103. Did not seem to understand what I needed or wanted  
☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely
104. Let me decide things for myself  
☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely
105. Made me feel I wasn't wanted  
☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely
106. Could make me feel better when I was upset  
☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely
107. Did not talk with me very much  
☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely
108. Tried to make me feel dependent of her/him  
☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely

**109.** Felt I could not look after myself unless she/he was around

☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely

**110.** Gave me as much freedom as I wanted

☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely

**111.** Let me go out as often as I wanted

☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely

**112.** Was overprotective of me

☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely

**113.** Did not praise me

☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely

**114.** Let me dress in any way I pleased

☐ Very likely ☐ Moderately likely ☐ Moderately unlikely ☐ Very unlikely

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Are Personality Traits and Physical Illnesses Related in Any Way?  
A number of different personality traits have been suspected of contributing to particular illnesses. For example, hostility and aggression were often linked to heart disease.  
It is important to note however, that research results are still inconclusive.

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## Analogue Investigation Survey



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## THE CHILDHOOD TRAUMA QUESTIONNAIRE (CTQ)

## Childhood Trauma Questionnaire

These questions ask about some of your experiences growing up as a child and a teenager. Although these questions are of a personal nature, please try to answer as honestly as you can. For each question, tick the circle corresponding to the answer that describes how you feel.

## When I was growing up...

115. I didn't have enough to eat.

☐ Never True
 ☐ Rarely True
 ☐ Sometimes True
 ☐ Often True
 ☐ Very Often True

116. I knew that there was someone to take care of me and protect me.

☐ Never True
 ☐ Rarely True
 ☐ Sometimes True
 ☐ Often True
 ☐ Very Often True

117. People in my family called me things like "stupid," "lazy," or "ugly."

☐ Never True
 ☐ Rarely True
 ☐ Sometimes True
 ☐ Often True
 ☐ Very Often True

118. My parents were too drunk or high to take care of the family.

☐ Never True
 ☐ Rarely True
 ☐ Sometimes True
 ☐ Often True
 ☐ Very Often True

119. There was someone in my family who helped me feel that I was important or special.

☐ Never True
 ☐ Rarely True
 ☐ Sometimes True
 ☐ Often True
 ☐ Very Often True

120. I had to wear dirty clothes.

☐ Never True
 ☐ Rarely True
 ☐ Sometimes True
 ☐ Often True
 ☐ Very Often True

121. I felt loved.

☐ Never True
 ☐ Rarely True
 ☐ Sometimes True
 ☐ Often True
 ☐ Very Often True

122. I thought that my parents wished I had never been born.

☐ Never True
 ☐ Rarely True
 ☐ Sometimes True
 ☐ Often True
 ☐ Very Often True

123. I got hit so hard by someone in my family that I had to see a doctor or go to the hospital

☐ Never True
 ☐ Rarely True
 ☐ Sometimes True
 ☐ Often True
 ☐ Very Often True

124. There was nothing I wanted to change about my family.

☐ Never True
 ☐ Rarely True
 ☐ Sometimes True
 ☐ Often True
 ☐ Very Often True

125. People in my family hit me so hard that it left me with bruises or marks.

☐ Never True
 ☐ Rarely True
 ☐ Sometimes True
 ☐ Often True
 ☐ Very Often True

126. I was punished with a belt, a board, a cord, or some other hard object.

☐ Never True
 ☐ Rarely True
 ☐ Sometimes True
 ☐ Often True
 ☐ Very Often True

127. People in my family looked out for each other.  
☐ Never True ☐ Rarely True ☐ Sometimes True ☐ Often True ☐ Very Often True
128. People in my family said hurtful or insulting things to me.  
☐ Never True ☐ Rarely True ☐ Sometimes True ☐ Often True ☐ Very Often True
129. I believe that I was physically abused.  
☐ Never True ☐ Rarely True ☐ Sometimes True ☐ Often True ☐ Very Often True
130. I had the perfect childhood.  
☐ Never True ☐ Rarely True ☐ Sometimes True ☐ Often True ☐ Very Often True
131. I got hit or beaten so badly that it was noticed by someone like a teacher, neighbor, or doctor.  
☐ Never True ☐ Rarely True ☐ Sometimes True ☐ Often True ☐ Very Often True
132. I felt like someone in my family hated me.  
☐ Never True ☐ Rarely True ☐ Sometimes True ☐ Often True ☐ Very Often True
133. People in my family felt close to each other.  
☐ Never True ☐ Rarely True ☐ Sometimes True ☐ Often True ☐ Very Often True
134. Someone tried to touch me in a sexual way, or tried to make me touch them.  
☐ Never True ☐ Rarely True ☐ Sometimes True ☐ Often True ☐ Very Often True
135. Someone threatened to hurt me or tell lies about me unless I did something sexual with them.  
☐ Never True ☐ Rarely True ☐ Sometimes True ☐ Often True ☐ Very Often True
136. I had the best family in the world.  
☐ Never True ☐ Rarely True ☐ Sometimes True ☐ Often True ☐ Very Often True
137. Someone tried to make me do sexual things or watch sexual things.  
☐ Never True ☐ Rarely True ☐ Sometimes True ☐ Often True ☐ Very Often True
138. Someone molested me.  
☐ Never True ☐ Rarely True ☐ Sometimes True ☐ Often True ☐ Very Often True
139. I believe that I was emotionally abused.  
☐ Never True ☐ Rarely True ☐ Sometimes True ☐ Often True ☐ Very Often True
140. There was someone to take me to the doctor if I needed it.  
☐ Never True ☐ Rarely True ☐ Sometimes True ☐ Often True ☐ Very Often True
141. I believe that I was sexually abused.  
☐ Never True ☐ Rarely True ☐ Sometimes True ☐ Often True ☐ Very Often True
142. My family was a source of strength and support.  
☐ Never True ☐ Rarely True ☐ Sometimes True ☐ Often True ☐ Very Often True

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### Do Animals Have Personalities?

Does it ever seem like your beloved pet has a personality that makes him utterly unique? Animal researchers have found animals from nearly every species of animal (from spiders to birds to elephants) have their own personalities with preferences, behaviors and quirks that persist throughout life.

While some critics suggest that this represents anthropomorphism, or ascribing human traits to animals, animal personality researchers have been able to identify consistent behavioral patterns that can be empirically measured and tested.

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## RELATIONSHIP SCALE QUESTIONNAIRE (RSQ)

## Relationship Scale Questionnaire

Rate yourself and tick the circle corresponding to the answer that best describes your stand.

143. I find it difficult to depend on others

☐ Not at all like me
 ☐ Rarely like me
 ☐ Somewhat like me
 ☐ Often like me
 ☐ Very like me

144. I worry that I will be hurt if I allow myself to become too close to others

☐ Not at all like me
 ☐ Rarely like me
 ☐ Somewhat like me
 ☐ Often like me
 ☐ Very like me

145. I am comfortable without close emotional relationships

☐ Not at all like me
 ☐ Rarely like me
 ☐ Somewhat like me
 ☐ Often like me
 ☐ Very like me

146. I am not sure that I can always depend on others to be there when I need them

☐ Not at all like me
 ☐ Rarely like me
 ☐ Somewhat like me
 ☐ Often like me
 ☐ Very like me

147. I worry about being alone

☐ Not at all like me
 ☐ Rarely like me
 ☐ Somewhat like me
 ☐ Often like me
 ☐ Very like me

148. I often worry that romantic partners don't really love me and won't want to stay with me

☐ Not at all like me
 ☐ Rarely like me
 ☐ Somewhat like me
 ☐ Often like me
 ☐ Very like me

149. I find it difficult to trust others completely

☐ Not at all like me
 ☐ Rarely like me
 ☐ Somewhat like me
 ☐ Often like me
 ☐ Very like me

150. I worry about others getting too close to me

☐ Not at all like me
 ☐ Rarely like me
 ☐ Somewhat like me
 ☐ Often like me
 ☐ Very like me

151. I worry that others don't value me as much as I value them

☐ Not at all like me
 ☐ Rarely like me
 ☐ Somewhat like me
 ☐ Often like me
 ☐ Very like me

152. People are never there when you need them

☐ Not at all like me
 ☐ Rarely like me
 ☐ Somewhat like me
 ☐ Often like me
 ☐ Very like me

153. My desire to merge completely sometimes scares people away

☐ Not at all like me
 ☐ Rarely like me
 ☐ Somewhat like me
 ☐ Often like me
 ☐ Very like me

154. I am nervous when anyone gets too close to me

☐ Not at all like me
 ☐ Rarely like me
 ☐ Somewhat like me
 ☐ Often like me
 ☐ Very like me

155. I worry about being abandoned

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☐ Not at all like me ☐ Rarely like me ☐ Somewhat like me ☐ Often like me ☐ Very like me

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## BARRATT IMPULSIVENESS SCALE (BIS-11)

## Barratt Impulsiveness Scale

People differ in the ways they act and think in different situations. This is a test to measure some of the ways in which you act and think. Read each statement and tick the circle corresponding to the answer that fits best. Do not spend too much time on any statement. Answer quickly and honestly.

156. I plan tasks carefully

☐ Rarely/Never ☐ Occasionally ☐ Often ☐ Almost/Always

157. I do things without thinking

☐ Rarely/Never ☐ Occasionally ☐ Often ☐ Almost/Always

158. I make-up my mind quickly

☐ Rarely/Never ☐ Occasionally ☐ Often ☐ Almost/Always

159. I am happy-go-lucky

☐ Rarely/Never ☐ Occasionally ☐ Often ☐ Almost/Always

160. I don't "pay attention"

☐ Rarely/Never ☐ Occasionally ☐ Often ☐ Almost/Always

161. I have "racing" thoughts

☐ Rarely/Never ☐ Occasionally ☐ Often ☐ Almost/Always

162. I plan trips well ahead of time

☐ Rarely/Never ☐ Occasionally ☐ Often ☐ Almost/Always

163. I am self controlled

☐ Rarely/Never ☐ Occasionally ☐ Often ☐ Almost/Always

164. I concentrate easily

☐ Rarely/Never ☐ Occasionally ☐ Often ☐ Almost/Always

165. I save regularly

☐ Rarely/Never ☐ Occasionally ☐ Often ☐ Almost/Always

166. I "squirm" at plays or lectures

☐ Rarely/Never ☐ Occasionally ☐ Often ☐ Almost/Always

167. I am a careful thinker

☐ Rarely/Never ☐ Occasionally ☐ Often ☐ Almost/Always

168. I plan for job security  
☐ Rarely/Never ☐ Occasionally ☐ Often ☐ Almost/Always
169. I say things without thinking  
☐ Rarely/Never ☐ Occasionally ☐ Often ☐ Almost/Always
170. I like to think about complex problems  
☐ Rarely/Never ☐ Occasionally ☐ Often ☐ Almost/Always
171. I change jobs  
☐ Rarely/Never ☐ Occasionally ☐ Often ☐ Almost/Always
172. I act "on impulse"  
☐ Rarely/Never ☐ Occasionally ☐ Often ☐ Almost/Always
173. I get easily bored when solving thought problems  
☐ Rarely/Never ☐ Occasionally ☐ Often ☐ Almost/Always
174. I act on the spur of the moment  
☐ Rarely/Never ☐ Occasionally ☐ Often ☐ Almost/Always
175. I am a steady thinker  
☐ Rarely/Never ☐ Occasionally ☐ Often ☐ Almost/Always
176. I change residences  
☐ Rarely/Never ☐ Occasionally ☐ Often ☐ Almost/Always
177. I buy things on impulse  
☐ Rarely/Never ☐ Occasionally ☐ Often ☐ Almost/Always
178. I can only think about one thing at a time  
☐ Rarely/Never ☐ Occasionally ☐ Often ☐ Almost/Always
179. I change hobbies  
☐ Rarely/Never ☐ Occasionally ☐ Often ☐ Almost/Always
180. I spend or charge more than I earn  
☐ Rarely/Never ☐ Occasionally ☐ Often ☐ Almost/Always
181. I often have extraneous thoughts when thinking  
☐ Rarely/Never ☐ Occasionally ☐ Often ☐ Almost/Always
182. I am more interested in the present than the future  
☐ Rarely/Never ☐ Occasionally ☐ Often ☐ Almost/Always
183. I am restless at the theater or lectures  
☐ Rarely/Never ☐ Occasionally ☐ Often ☐ Almost/Always
184. I like puzzles



☐ Rarely/Never ☐ Occasionally ☐ Often ☐ Almost/Always

185. I am future oriented

☐ Rarely/Never ☐ Occasionally ☐ Often ☐ Almost/Always

Continue >

Survey testing only

Check Answers & Continue >

Analogue Investigation Survey



Would you Consider yourself More of a "Dog Person" or a "Cat Person"?

According to one personality study, your answer to this question might actually reveal important information about your personality.

In a study of 4,500 people, researchers asked participants whether they considered themselves to be more dog people or cat people. These individuals also completed a personality survey that measured a number of broad traits including conscientiousness, openness, neuroticism and agreeableness.

The researchers discovered that people who identified themselves as dog people tended to be more extroverted and eager to please others, while those who described themselves as cat people tended to be more introverted and curious.

[Continue >](#)

## Analogue Investigation Survey



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## THE INVENTORY OF INTERPERSONAL PROBLEMS (IIP-32)

## Inventory of Interpersonal Problems

People have reported having the following problems in relating to other people. Please read the list below, and for each item, consider it has been a problem for you with respect to any significant person in your life. Then tick the circle corresponding to the answer that describes how distressing that problem has been.

*The following are things you find hard to do with other people.*

*It is hard for me to:*

186. Say "no" to other people

☐ Not at all ☐ A little bit ☐ Moderately ☐ Quite a bit ☐ Extremely

187. Join in on groups

☐ Not at all ☐ A little bit ☐ Moderately ☐ Quite a bit ☐ Extremely

188. Keep things private from other people

☐ Not at all ☐ A little bit ☐ Moderately ☐ Quite a bit ☐ Extremely

189. Tell a person to stop bothering me

☐ Not at all ☐ A little bit ☐ Moderately ☐ Quite a bit ☐ Extremely

190. Introduce myself to new people

☐ Not at all ☐ A little bit ☐ Moderately ☐ Quite a bit ☐ Extremely

191. Confront people with problems that come up

☐ Not at all ☐ A little bit ☐ Moderately ☐ Quite a bit ☐ Extremely

192. Be assertive with another person

☐ Not at all ☐ A little bit ☐ Moderately ☐ Quite a bit ☐ Extremely

193. Let other people know when I am angry

☐ Not at all ☐ A little bit ☐ Moderately ☐ Quite a bit ☐ Extremely

194. Socialise with other people

☐ Not at all ☐ A little bit ☐ Moderately ☐ Quite a bit ☐ Extremely

195. Show affection to other people

☐ Not at all ☐ A little bit ☐ Moderately ☐ Quite a bit ☐ Extremely

196. Get along with people

☐ Not at all ☐ A little bit ☐ Moderately ☐ Quite a bit ☐ Extremely

197. Be firm when I need to be

☐ Not at all ☐ A little bit ☐ Moderately ☐ Quite a bit ☐ Extremely

198. Experience a feeling of love for another person

☐ Not at all ☐ A little bit ☐ Moderately ☐ Quite a bit ☐ Extremely

199. Be supportive of another person's goals in life

☐ Not at all ☐ A little bit ☐ Moderately ☐ Quite a bit ☐ Extremely

200. Feel close to another person

☐ Not at all ☐ A little bit ☐ Moderately ☐ Quite a bit ☐ Extremely

201. Really care about other people's problems

☐ Not at all ☐ A little bit ☐ Moderately ☐ Quite a bit ☐ Extremely

202. Put somebody else's needs before my own

☐ Not at all ☐ A little bit ☐ Moderately ☐ Quite a bit ☐ Extremely

203. Feel good about another person's happiness

☐ Not at all ☐ A little bit ☐ Moderately ☐ Quite a bit ☐ Extremely

204. Ask other people to get together socially with me

☐ Not at all ☐ A little bit ☐ Moderately ☐ Quite a bit ☐ Extremely

205. Be assertive without worrying about hurting the other person's feelings

☐ Not at all ☐ A little bit ☐ Moderately ☐ Quite a bit ☐ Extremely

**The following are things that you do too much.**

206. I open up to people too much

☐ Not at all ☐ A little bit ☐ Moderately ☐ Quite a bit ☐ Extremely

207. I am too aggressive toward other people

☐ Not at all ☐ A little bit ☐ Moderately ☐ Quite a bit ☐ Extremely

208. I try to please other people too much

☐ Not at all ☐ A little bit ☐ Moderately ☐ Quite a bit ☐ Extremely

209. I want to be noticed too much

☐ Not at all ☐ A little bit ☐ Moderately ☐ Quite a bit ☐ Extremely

210. I try to control other people too much

☐ Not at all ☐ A little bit ☐ Moderately ☐ Quite a bit ☐ Extremely

211. I put other people's needs before my own too much

☐ Not at all ☐ A little bit ☐ Moderately ☐ Quite a bit ☐ Extremely

212. I am overly generous to other people

☐ Not at all ☐ A little bit ☐ Moderately ☐ Quite a bit ☐ Extremely

213. I manipulate other people too much to get what I want

☐ Not at all ☐ A little bit ☐ Moderately ☐ Quite a bit ☐ Extremely

**214.** I tell personal things to other people too much

☐ Not at all ☐ A little bit ☐ Moderately ☐ Quite a bit ☐ Extremely

**215.** I argue with other people too much

☐ Not at all ☐ A little bit ☐ Moderately ☐ Quite a bit ☐ Extremely

**216.** I let other people take advantage of me too much

☐ Not at all ☐ A little bit ☐ Moderately ☐ Quite a bit ☐ Extremely

**217.** I am affected by another person's misery too much

☐ Not at all ☐ A little bit ☐ Moderately ☐ Quite a bit ☐ Extremely

**Continue >**

Survey testing only

**Check Answers & Continue >**

## Analogue Investigation Survey



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**And that is it!**

**218.** Please enter a valid email address in order for us to contact you in case you win the iPad.

**Now please click continue in order to properly finish the survey!**

**Continue >**

Survey testing only

**Check Answers & Continue >**

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## Analogue Investigation Survey



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### Final Page

You have reached the end of the survey! But **before you leave this page, please read the following:**

As before mentioned due to the nature of the survey, the possibility that you may experience a degree of psychological distress as a consequence of your participation cannot be ruled out. If this situation were to arise, please seek help as soon as possible. Here is a list of resources that you may be able to access:

University of Edinburgh Student Counselling

\* Tel: 0131 650 4170

\* <http://www.ed.ac.uk/schools-departments/student-counselling/home>

Edinburgh Samaritans

\* Tel: 0131 221 9999

\* <http://www.edinburghsamaritans.org>

Survivors UK

\* Tel: 0845 122 1201

\* <http://www.survivorsuk.org/>

**The winner of the draw will be notified through email one week after the closing of the survey.**

Please follow this link to end the survey:

**[Bristol Online Surveys Homepage](#)**

**THANK YOU SO MUCH FOR YOUR PARTICIPATION!**

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**Appendix 5:** The ethical approval for the study from the School of Health in Social Sciences at The University of Edinburgh.



School of Health in Social Science  
Medical School, Teviot Place  
Edinburgh  
EH8 9AG

Telephone: 0131 650  
Fax: 0131 650 3891

Email: sorourke@staffmail.ed.ac.uk

Luis Salayandia  
16 Thirston Way  
Newcastle upon Tyne  
NE3 3ES

Dear Luis

Re: Borderline Personality Disorder & Mentalization: An Analogue Investigation of The Role of Mentalization in Areas of Dysfunction Associated with Borderline Personality Disorder


\*\*\*\*

A Grounded Theory Investigation of Changes in Mentalization among Teams of Mental Health Professionals after Mentalized-Based Training

Many thanks for submitting the above research project for review by the Clinical Psychology Ethics Research Panel. I can confirm that the submission has been independently reviewed and was approved on the 4<sup>th</sup> February 2012. Should there be any change to the research protocol it is important that you alert us to this as this may necessitate further review.

With best wishes

Yours sincerely

  
Dr. Suzanne O'Rourke



## Appendix 6: Research participant consent form.



An Analogue Investigation of the Role of Mentalization in Areas of Dysfunction  
Associated with Borderline Personality Disorder

**Researcher:** Luis Salayandia, PhD Research Student in Clinical Psychology

**Supervisor:** Matthias Schwannauer (Consultant Clinical Psychologist)

**Supervisors:** Helen Griffiths (Consultant Clinical Psychologist)

### RESEARCH PARTICIPANT CONSENT FORM

**Please read the following statements and check the box to indicate that you agree:**

- ☐ I confirm that I have read and I understand the information sheet presented to me in the previous screen for the above study.
- ☐ I have had the opportunity to consider the information. If you have any questions that were not resolved, please contact the researcher before continuing.
- ☐ I understand that I may ask further questions at any time.
- ☐ I also understand that I am free to withdraw from the study at any time, or to decline to answer any particular questions in the study.
- ☐ I agree to provide information to the researchers under the conditions of confidentiality set out on the participant information sheet.
- ☐ I wish to participate in this study under the conditions set out in the Participant Information sheet.
- ☐ I consent to the information collected for in this study to be used in this study under the conditions set out on the participant information sheet.

## Appendix 7: Participant information sheet.



### **An Analogue Investigation of the Role of Mentalization in Areas of Dysfunction Associated with Borderline Personality Disorder**

#### **PARTICIPANT INFORMATION SHEET**

**Thank you for clicking on the link to this page.** My name is Luis Salayandia and I am a PhD student in clinical psychology at the University of Edinburgh. Before you enter the survey please read the following information.

#### **What is the purpose of the study?**

The purpose of this study is to examine the link between early upbringing environments, psychological processes, and the use of strategies to regulate emotion when dealing with personal difficulties in a sample of university students.

#### **Why have I been chosen?**

You are being approached to take part in the study because you are an undergraduate student of psychology or philosophy at the University of Edinburgh.

#### **Do I have to take part?**

No. It is up to you to decide whether or not to take part. If you decide to take part you will be asked to give your consent on the following page. You can click on "exit this survey" at any time, without giving a reason and no further contact will be made.

#### **What will I have to do?**

If you decide to participate, you will be asked to complete a survey consisting of an assortment of self-report measures.

#### **Will my taking part in this study be kept confidential?**

Your answers are recorded purely for research purposes and will be kept confidential. Individual responses will be anonymised and will not be shared with your college or university. Should the research lead to publications in scientific journals, your identification will not be included in any publication.

#### **Are there any down sides to taking part?**

It is possible that the questionnaires may cover topics that are sensitive or difficult for you to think about. If you feel any distress you can stop the questionnaire at any stage. We will also provide support numbers at the end if you feel you would like to talk to someone about any of the topics covered.

#### **Who has reviewed the study?**

The study has been reviewed and approved by The University of Edinburgh School of Health Ethics Committee. Thank you very much for reading this and for any further involvement with this study. Please click on next to give your consent and enter the survey.

#### **What will I get out of taking part?**

The study is divided in two parts. If you complete both parts of the survey, you will be given the opportunity to enter a prize draw with chances to win an iPod Nano. To enter the competition you must complete part one and part two of the survey and provide a valid email address. The winner will be notified through email.

#### **For further information Please contact**

**Luis Salayandia**, at University of Edinburgh, Old Medical School, Teviot Place (Room 3.2).  
**Email:** J.L.Lira-Salayandia@sms.ed.ac.uk or **Tel:** 0785-293-0845

## Appendix 8: Research protocol.

### Research Protocol

<div> </div> <p>Research Project to be submitted for the PhD by Research in Clinical Psychology, The University of Edinburgh</p> <p><b>Contacts:</b></p> <p>Luis Salayandia PhD Research Student</p> <p>School of Health in Social Science The University of Edinburgh Old Medical School, Teviot Place (Room 3.2) Edinburgh, EH8 9AG Email: J.L.Lirasalayandia@sms.ed.ac.uk Tel: 0785-293-0845</p> <p>Dr. Matthias Schwannauer</p> <p>School of Health in Social Science The University of Edinburgh Old Medical School, Teviot Place Edinburgh, EH8 9AG Email: M.Schwannauer@ed.ac.uk Tel: 0131-651-3954</p> <p>Dr. Helen Griffiths</p> <p>School of Health in Social Science The University of Edinburgh Old Medical School, Teviot Place Edinburgh, EH8 9AG Email: Helen.Griffiths@nhslothian.scot.nhs.uk Tel: 0131-650-3482</p>	<p><b>An Analogue Investigation of the Role of Mentalization in Areas of Dysfunction Associated with Borderline Personality Disorder</b></p> <p><b>November 2011 – September 2013</b></p> <p><b>Background:</b> In 2003, Lejuez and colleagues noted that while the evaluation of the processes and mechanisms of Borderline Personality Disorder (BPD) in non-clinical populations is a necessary first step to better understand and treat the disorder, the numbers of analogue studies conducted in this area of research had been few and far apart. This trend has remained unchanged throughout the years and the number of studies currently available is still limited. Given the lack of literature on the topic and the fact that current treatments for BPD continue to further develop, the knowledge on the underlying mechanisms of BPD, possible mediators, and the disorder in general could significantly be advanced through the use of analogue research.</p> <p><b>This study aims to investigate the following:</b></p> <p>This study aims to investigate the following hypotheses:</p> <ol style="list-style-type: none"> <li>1) There will be a statistically significant mediational relationship between self-reports of childhood trauma, scores indicating the use of expressive suppression, and high scores in areas of dysfunction associated with BPD.</li> <li>2) There will be a statistically significant mediational relationship among self-reports of childhood trauma, low scores in Reflective Function, and high scores in areas of dysfunction associated with BPD.</li> </ol> <p><b>Method:</b> This is an internet-based study using Survey Monkey, a web-based tool that enables researchers and other users to create online surveys. Survey Monkey assigns a link which will be e-mailed to all the participants. Once a participant presses on the link, he/she will be routed to the electronic page assigned by Survey Monkey. Before starting the survey, each participant will be presented with a Participant Information Sheet which will inform them of the following:</p> <ol style="list-style-type: none"> <li>1. General information about the study and the researcher</li> <li>2. Specific instructions on how to complete the survey</li> <li>3. Statement of confidentiality</li> <li>4. Informed consent regarding the participant's right not to participate on the study</li> <li>5. A statement regarding incentives</li> <li>6. A statement about any possible drawbacks of participating in the survey (e.g. feeling upset because of the nature of the questions) and the participant's right/choice to terminate the survey at any time.</li> <li>7. General information about ethical approval for the survey.</li> </ol> <p>The participants are expected to be a representative sample of the university's population in regards to age, gender, race, and ethnicity. Each participant will be asked to complete a survey consisting of an assortment of self-report measures. The study will consist of two parts. In the first part, the participants will answer a series of screening questions for childhood trauma, and will be asked to complete all but two of the self-report measures. Students will be then given the option of ending the survey at that point or to continue to answer the second part of the study. The rationale of dividing the study in two parts is to screen for participants who score high on index measures during the first part, and to collect more information on the expected small subsample during the second part of the study.</p>
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	<p>The following measures may be used during the first part of the study:</p> <ol style="list-style-type: none"> <li>1. The Emotion Regulation Questionnaire (ERQ): The ERQ (Gross &amp; John, 2003) is a self-report inventory that identifies expressive suppression and cognitive reappraisal. The ERQ has been shown to have acceptable reliability and good validity.</li> <li>2. Metacognition Questionnaire-short form (MCQ-30): The MCQ-30 is a multidimensional instrument for assessing metacognitions. It has been found to be valid and reliable and is considered to be appropriate for use in clinical research.</li> <li>3. The Relationships Scales Questionnaire (RSQ): The RSQ (Griffin &amp; Bartholomew, 1994) is a self-report measure intended to be a continuous measure of adult attachment. The authors do not provide a normative data for this scale, but it is a scale that has been previously used in studies researching attachment.</li> <li>4. The Inventory of Interpersonal Problems-Short Circumplex (IIP-SC): The IIP-SC (Soldz, Budman, Demby, &amp; Merry, 1995) was constructed to be used in research and in situations where the patient needs to be screened for interpersonal problems in a short period of time. The IIP-SC has been found to be highly correlated with the full version of the IIP, a valid and reliable measure, and has shown similar treatment responsiveness.</li> <li>5. The Barratt Impulsiveness Scale (BIS-11): The BIS-11 (Patton et al., 1995) is intended to assess an individual's general impulsiveness from a multi-factorial perspective. The instrument has good internal consistency.</li> <li>6. The Hospital Anxiety and Depression Scale (HADS): The HADS (Zigmond &amp; Snaith, 1983) is a self-report measure intended to assess for depression and anxiety. The HADS has consistently been found to be a reliable measure of both anxiety and depression.</li> </ol> <p>During the second part of the study, the following measures may be administered:</p> <ol style="list-style-type: none"> <li>1. The Childhood Trauma Questionnaire (CTQ): The CTQ (Fink &amp; Bernstein, 1997) is a self-report inventory that identifies abuse and neglect. The inventory has been found to be valid and reliable and it can be used with adults and adolescents.</li> <li>2. The Parenting Bonding Instrument (PBI): The PBI (Parker, Tupling, &amp; Brown, 1979) measures perceived maternal and parental care and over-protectiveness. The PBI has good psychometric properties, and it has been found to be both valid and reliable.</li> </ol> <p>The process is expected to take 60 minutes or less for the first part of the study, with an additional, but optional, 20 minutes for the second part. All the self-report questionnaires will be grouped strategically to increase the likelihood the participants will complete the entire battery of self-reports. As above stated, participation will be voluntary, and the participant will have the option of terminating the survey at any time throughout the process.</p> <p><b>Ethical considerations:</b> Informed consent will be obtained from each participant in the study. The privacy, confidentiality, and anonymity of each participant will be guaranteed. General and University of Edinburgh School on Health Ethics Committee guidelines will be strictly followed.</p>
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## **Appendix 9: Invitational Statement.**

Hello,

My name is Luis Salayandia and I am writing to you because ***I need your help***. I am a clinical psychology student investigating factors that may be relevant in the development of Borderline Personality Disorder.

By now you may be thinking...But I do not have a personality disorder, so how could I possibly help? Since having a personality disorder is not requirement, you can help by participating in the following survey! (Please click on the link below)

<https://www.survey.ed.ac.uk/analogue-survey/>

The survey should take just over 30 minutes, and if you complete it you will be entered in a draw with the chance to ***win a new ipad!***

So please help me and participate!

Thank you for taking the time to read this email, and thanks in advance for your participation.

Luis Salayandia.

**Appendix 10:** Complete list of schools colleges and universities that were asked to participate in the study.

Schools within the University of Edinburgh that agreed to disseminate the survey

The School of Chemistry  
The School of GeoSciences  
The School of Health in Social Science  
The School of Informatics  
The Edinburgh College of Art.

Universities and Colleges in Edinburgh that agreed to disseminate the survey

Jewel & Esk College (Edinburgh Campus)  
Leith School of Art  
Queen Margaret University  
Telford College


University of Edinburgh schools that did not agree to disseminate the survey

The School of Biological Sciences  
The School of Biomedical Sciences  
The School of Business  
The School of Classics and Archaeology  
The School of Clinical Sciences and Community Health  
The School of Divinity  
The School of Economics  
The School of Education  
The School of Engineering  
The School of Law  
The School of Literature, Languages and Culture  
The School of Mathematics  
The School of Molecular and Clinical Medicine  
The School of Philosophy, Psychology and Languages  
The School of Physics and Astronomy  
The School of Social and Political Sciences  
The School of Veterinarian Studies


Universities and Colleges in Edinburgh that did not agree to disseminate the survey

Edinburgh Business School  
Heriot-Watt University  
Napier University  
Newbattle Abbey College  
Oatridge College  
Scottish Agricultural College (Edinburgh)  
Stevenson College  
West Lothian College

## Appendix 11: CTQ



Name: \_\_\_\_\_  
 Age: \_\_\_\_\_ Sex: \_\_\_\_\_



When I was growing up ...	Never True	Rarely True	Sometimes True	Often True	Very Often True
1. I didn't have enough to eat.	●	●	●	●	●
2. I knew that there was someone to take care of me and protect me.	●	●	●	●	●
3. People in my family called me things like "stupid," "lazy," or "ugly."	●	●	●	●	●
4. My parents were too drunk or high to take care of the family.	●	●	●	●	●
5. There was someone in my family who helped me feel that I was important or special.	●	●	●	●	●
6. I had to wear dirty clothes.	●	●	●	●	●
7. I felt loved.	●	●	●	●	●
8. I thought that my parents wished I had never been born.	●	●	●	●	●
9. I got hit so hard by someone in my family that I had to see a doctor or go to the hospital.	●	●	●	●	●
10. There was nothing I wanted to change about my family.	●	●	●	●	●
11. People in my family hit me so hard that it left me with bruises or marks.	●	●	●	●	●
12. I was punished with a belt, a board, a cord, or some other hard object.	●	●	●	●	●
13. People in my family looked out for each other.	●	●	●	●	●
14. People in my family said hurtful or insulting things to me.	●	●	●	●	●
15. I believe that I was physically abused.	●	●	●	●	●
16. I had the perfect childhood.	●	●	●	●	●
17. I got hit or beaten so badly that it was noticed by someone like a teacher, neighbor, or doctor.	●	●	●	●	●
18. I felt that someone in my family hated me.	●	●	●	●	●
19. People in my family felt close to each other.	●	●	●	●	●
20. Someone tried to touch me in a sexual way, or tried to make me touch them.	●	●	●	●	●
21. Someone threatened to hurt me or tell lies about me unless I did something sexual with them.	●	●	●	●	●
22. I had the best family in the world.	●	●	●	●	●
23. Someone tried to make me do sexual things or watch sexual things.	●	●	●	●	●
24. Someone molested me.	●	●	●	●	●
25. I believe that I was emotionally abused.	●	●	●	●	●
26. There was someone to take me to the doctor if I needed it.	●	●	●	●	●
27. I believe that I was sexually abused.	●	●	●	●	●
28. My family was a source of strength and support.	●	●	●	●	●

## Appendix 12: ERQ

### Emotion Regulation Questionnaire (ERQ)

Gross &amp; John

9/03

The Emotion Regulation Questionnaire is designed to assess individual differences in the habitual use of two emotion regulation strategies: cognitive reappraisal and expressive suppression.

## Citation

Gross, J.J., & John, O.P. (2003). Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology*, 85, 348-362.

### Instructions and Items

We would like to ask you some questions about your emotional life, in particular, how you control (that is, regulate and manage) your emotions. The questions below involve two distinct aspects of your emotional life. One is your emotional experience, or what you feel like inside. The other is your emotional expression, or how you show your emotions in the way you talk, gesture, or behave. Although some of the following questions may seem similar to one another, they differ in important ways. For each item, please answer using the following scale:

1-----2-----3-----4-----5-----6-----7  
strongly neutral strongly  
disagree agree

1. \_\_\_\_ When I want to feel more *positive* emotion (such as joy or amusement), I *change what I'm thinking about*.
2. \_\_\_\_ I keep my emotions to myself.
3. \_\_\_\_ When I want to feel less *negative* emotion (such as sadness or anger), I *change what I'm thinking about*.
4. \_\_\_\_ When I am feeling *positive* emotions, I am careful not to express them.
5. \_\_\_\_ When I'm faced with a stressful situation, I make myself *think about it* in a way that helps me stay calm.
6. \_\_\_\_ I control my emotions by *not expressing them*.
7. \_\_\_\_ When I want to feel more *positive* emotion, I *change the way I'm thinking about* the situation.
8. \_\_\_\_ I control my emotions by *changing the way I think about* the situation I'm in.
9. \_\_\_\_ When I am feeling *negative* emotions, I make sure not to express them.
10. \_\_\_\_ When I want to feel less *negative* emotion, I *change the way I'm thinking about* the situation.

### Note

Do not change item order, as items 1 and 3 at the beginning of the questionnaire define the terms “positive emotion” and “negative emotion”.

### Scoring (no reversals)

Reappraisal Items: 1, 3, 5, 7, 8, 10; Suppression Items: 2, 4, 6, 9.



## Appendix 13: MCQ

### METACOGNITIONS QUESTIONNAIRE 30 (MCQ-30)

*Adrian Wells and Samantha Cartwright-Hatton*

This questionnaire is concerned with beliefs people have about their thinking. Listed below are a number of beliefs that people have expressed. Please read each item and say how much you *generally* agree with it by *circling* the appropriate number.

Please respond to all the items, there are no right or wrong answers.

Gender: \_\_\_\_\_ Age: \_\_\_\_\_

	Do not agree	Agree slightly	Agree moderately	Agree very much
1. Worrying helps me to avoid problems in the future.	1	2	3	4
2. My worrying is dangerous for me.	1	2	3	4
3. I think a lot about my thoughts.	1	2	3	4
4. I could make myself sick with worrying.	1	2	3	4
5. I am aware of the way my mind works when I am thinking through a problem.	1	2	3	4
6. If I did not control a worrying thought, and then it happened, it would be my fault.	1	2	3	4
7. I need to worry in order to remain organized.	1	2	3	4
8. I have little confidence in my memory for words and names.	1	2	3	4
9. My worrying thoughts persist, no matter how I try to stop them.	1	2	3	4
10 Worrying helps me to get things sorted out in my mind.	1	2	3	4
11. I cannot ignore my worrying thoughts.	1	2	3	4
12. I monitor my thoughts.	1	2	3	4
13. I should be in control of my thoughts all of the time.	1	2	3	4
14. My memory can mislead me at times.	1	2	3	4

	Do not agree	Agree slightly	Agree moderately	Agree very much
15. My worrying could make me go mad.	1	2	3	4
16. I am constantly aware of my thinking.	1	2	3	4
17. I have a poor memory.	1	2	3	4
18. I pay close attention to the way my mind works.	1	2	3	4
19. Worrying helps me cope.	1	2	3	4
20. Not being able to control my thoughts is a sign of weakness.	1	2	3	4
21. When I start worrying, I cannot stop.	1	2	3	4
22. I will be punished for not controlling certain thoughts.	1	2	3	4
23. Worrying helps me to solve problems.	1	2	3	4
24. I have little confidence in my memory for places.	1	2	3	4
25. It is bad to think certain thoughts.	1	2	3	4
26. I do not trust my memory.	1	2	3	4
27. If I could not control my thoughts, I would not be able to function.	1	2	3	4
28. I need to worry in order to work well.	1	2	3	4
29. I have little confidence in my memory for actions.	1	2	3	4
30. I constantly examine my thoughts.	1	2	3	4

*Please ensure that you have responded to all items. Thank you.*

## Appendix 14: RSQ

### RELATIONSHIP SCALE QUESTIONNAIRE (RSQ)

**Instructions:** Rate yourself on a scale of 1-5 for each question that best describes your stand.

- 1= not at all like me
- 2= rarely like me
- 3= somewhat like me
- 4= often like me
- 5= very like me

1. I find it difficult to depend on others.
2. I worry that I will be hurt if I allow myself to become too close to others.
3. I am comfortable without close emotional relationships.
4. I am not sure that I can always depend on others to be there when I need them.
5. I worry about being alone.
6. I often worry that romantic partners don't really love me and won't want to stay with me.
7. I find it difficult to trust others completely.
8. I worry about others getting too close to me.
9. I worry that others don't value me as much as I value them.
10. People are never there when you need them.
11. My desire to merge completely sometimes scares people away.
12. I am nervous when anyone gets too close to me.
13. I worry about being abandoned.

## Appendix 15: PBI

### MOTHER FORM

*This questionnaire lists various attitudes and behaviours of parents. As you remember your MOTHER in your first 16 years would you place a tick in the most appropriate box next to each question.*

	Very like	Moderately like	Moderately unlike	Very unlike
1. Spoke to me in a warm and friendly voice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Did not help me as much as I needed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Let me do those things I liked doing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Seemed emotionally cold to me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Appeared to understand my problems and worries	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Was affectionate to me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Liked me to make my own decisions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Did not want me to grow up	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Tried to control everything I did	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Invaded my privacy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Enjoyed talking things over with me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Frequently smiled at me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Tended to baby me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Did not seem to understand what I needed or wanted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Let me decide things for myself	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Made me feel I wasn't wanted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Could make me feel better when I was upset	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Did not talk with me very much	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Tried to make me feel dependent on her/him	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Felt I could not look after myself unless she/he was around	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Gave me as much freedom as I wanted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. Let me go out as often as I wanted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. Was overprotective of me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. Did not praise me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. Let me dress in any way I pleased	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**FATHER FORM**

*This questionnaire lists various attitudes and behaviours of parents. As you remember your FATHER in your first 16 years would you place a tick in the most appropriate box next to each question.*

	Very like	Moderately like	Moderately unlike	Very unlike
1. Spoke to me in a warm and friendly voice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Did not help me as much as I needed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Let me do those things I liked doing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Seemed emotionally cold to me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Appeared to understand my problems and worries	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Was affectionate to me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Liked me to make my own decisions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Did not want me to grow up	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Tried to control everything I did	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Invaded my privacy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Enjoyed talking things over with me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Frequently smiled at me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Tended to baby me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Did not seem to understand what I needed or wanted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Let me decide things for myself	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Made me feel I wasn't wanted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Could make me feel better when I was upset	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Did not talk with me very much	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Tried to make me feel dependent of her/him	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Felt I could not look after myself unless she/he was around	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Gave me as much freedom as I wanted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. Let me go out as often as I wanted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. Was overprotective of me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. Did not praise me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. Let me dress in any way I pleased	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



# IIP-32

## Question/ Scoring Sheet

Name: \_\_\_\_\_

Date: \_\_\_\_/\_\_\_\_/\_\_\_\_  
Month Day YearSex: Male ☐ Female ☐

People have reported having the following problems in relating to other people. Please read the list below, and for each item, consider whether it has been a problem for you with respect to **any** significant person in your life. Then fill in the numbered circle that describes how distressing that problem has been.

### The following are things you find hard to do with other people.

#### It is hard for me to:

- |   | Not at all | A little bit | Moderately | Quite a bit | Extremely |     |
|---|------------|--------------|------------|-------------|-----------|-----|
| 1. Say "no" to other people   | 0          | 1            | 2          | 3           | 4         | 1.  |
| 2. Join in on groups  | 0          | 1            | 2          | 3           | 4         | 2.  |
| 3. Keep things private from other people                                    | 0          | 1            | 2          | 3           | 4         | 3.  |
| 4. Tell a person to stop bothering me                                       | 0          | 1            | 2          | 3           | 4         | 4.  |
| 5. Introduce myself to new people   | 0          | 1            | 2          | 3           | 4         | 5.  |
| 6. Confront people with problems that come up                               | 0          | 1            | 2          | 3           | 4         | 6.  |
| 7. Be assertive with another person   | 0          | 1            | 2          | 3           | 4         | 7.  |
| 8. Let other people know when I am angry                                    | 0          | 1            | 2          | 3           | 4         | 8.  |
| 9. Socialize with other people  | 0          | 1            | 2          | 3           | 4         | 9.  |
| 10. Show affection to people  | 0          | 1            | 2          | 3           | 4         | 10. |
| 11. Get along with people   | 0          | 1            | 2          | 3           | 4         | 11. |
| 12. Be firm when I need to be   | 0          | 1            | 2          | 3           | 4         | 12. |
| 13. Experience a feeling of love for another person                         | 0          | 1            | 2          | 3           | 4         | 13. |
| 14. Be supportive of another person's goals in life                         | 0          | 1            | 2          | 3           | 4         | 14. |
| 15. Feel close to other people  | 0          | 1            | 2          | 3           | 4         | 15. |
| 16. Really care about other people's problems                               | 0          | 1            | 2          | 3           | 4         | 16. |
| 17. Put somebody else's needs before my own                                 | 0          | 1            | 2          | 3           | 4         | 17. |
| 18. Feel good about another person's happiness                              | 0          | 1            | 2          | 3           | 4         | 18. |
| 19. Ask other people to get together socially with me                       | 0          | 1            | 2          | 3           | 4         | 19. |
| 20. Be assertive without worrying about hurting the other person's feelings | 0          | 1            | 2          | 3           | 4         | 20. |

### The following are things that you do too much.

- |  |   |   |   |   |   |     |
|--|---|---|---|---|---|-----|
| 21. I open up to people too much.                          | 0 | 1 | 2 | 3 | 4 | 21. |
| 22. I am too aggressive toward other people.               | 0 | 1 | 2 | 3 | 4 | 22. |
| 23. I try to please other people too much.                 | 0 | 1 | 2 | 3 | 4 | 23. |
| 24. I want to be noticed too much.                         | 0 | 1 | 2 | 3 | 4 | 24. |
| 25. I try to control other people too much.                | 0 | 1 | 2 | 3 | 4 | 25. |
| 26. I put other people's needs before my own too much.     | 0 | 1 | 2 | 3 | 4 | 26. |
| 27. I am overly generous to other people.                  | 0 | 1 | 2 | 3 | 4 | 27. |
| 28. I manipulate other people too much to get what I want. | 0 | 1 | 2 | 3 | 4 | 28. |
| 29. I tell personal things to other people too much.       | 0 | 1 | 2 | 3 | 4 | 29. |
| 30. I argue with other people too much.                    | 0 | 1 | 2 | 3 | 4 | 30. |
| 31. I let other people take advantage of me too much.      | 0 | 1 | 2 | 3 | 4 | 31. |
| 32. I am affected by another person's misery too much.     | 0 | 1 | 2 | 3 | 4 | 32. |

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3 4 5 6 7 8 9 10 11 12 A B C D E

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## Appendix 17: BIS-11

DIRECTIONS: People differ in the ways they act and think in different situations. This is a test to measure some of the ways in which you act and think. Read each statement and put an X on the appropriate circle on the right side of this page. Do not spend too much time on any statement. Answer quickly and honestly.

	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Rarely/Never	Occasionally	Often	Almost Always/Always
1 I plan tasks carefully.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2 I do things without thinking.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3 I make-up my mind quickly.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4 I am happy-go-lucky.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5 I don't "pay attention."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6 I have "racing" thoughts.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7 I plan trips well ahead of time.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8 I am self controlled.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9 I concentrate easily.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10 I save regularly.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11 I "squirm" at plays or lectures.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12 I am a careful thinker.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13 I plan for job security.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14 I say things without thinking.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15 I like to think about complex problems.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16 I change jobs.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17 I act "on impulse."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18 I get easily bored when solving thought problems.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19 I act on the spur of the moment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20 I am a steady thinker.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
21 I change residences.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
22 I buy things on impulse.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
23 I can only think about one thing at a time.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
24 I change hobbies.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
25 I spend or charge more than I earn.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26 I often have extraneous thoughts when thinking.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
27 I am more interested in the present than the future.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28 I am restless at the theater or lectures.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
29 I like puzzles.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
30 I am future oriented.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



## Appendix 18: HADS

### HAD Scale - REFERENCE COPY for NHS STAFF

Name:

Date:

Doctors are aware that emotions play an important part in most illnesses and if your doctor knows about these feelings he will be able to help you more. This questionnaire is designed to help your doctor to know how you feel.

Read each item and place a firm tick in the box opposite the reply that comes closest to **how you have been feeling in the past week**.

Don't take too long over your replies; your immediate reaction to each item will probably be more accurate than a long thought-out response.

*Tick only one box in each section*

<p><b>I feel tense or 'wound up':</b></p> <table border="0"> <tr><td>Most of the time .....</td><td style="text-align: center;">A</td></tr> <tr><td>A lot of the time .....</td><td style="text-align: center;">3</td></tr> <tr><td>Time to time, Occasionally .....</td><td style="text-align: center;">2</td></tr> <tr><td>Not at all .....</td><td style="text-align: center;">1</td></tr> <tr><td></td><td style="text-align: center;">0</td></tr> </table>	Most of the time .....	A	A lot of the time .....	3	Time to time, Occasionally .....	2	Not at all .....	1		0	<p><b>I feel as if I am slowed down:</b></p> <table border="0"> <tr><td>Nearly all the time .....</td><td style="text-align: center;">D</td></tr> <tr><td>Very often .....</td><td style="text-align: center;">3</td></tr> <tr><td>Sometimes .....</td><td style="text-align: center;">2</td></tr> <tr><td>Not at all .....</td><td style="text-align: center;">1</td></tr> <tr><td></td><td style="text-align: center;">0</td></tr> </table>	Nearly all the time .....	D	Very often .....	3	Sometimes .....	2	Not at all .....	1		0
Most of the time .....	A																				
A lot of the time .....	3																				
Time to time, Occasionally .....	2																				
Not at all .....	1																				
	0																				
Nearly all the time .....	D																				
Very often .....	3																				
Sometimes .....	2																				
Not at all .....	1																				
	0																				
<p><b>I still enjoy the things I used to enjoy:</b></p> <table border="0"> <tr><td>Definitely as much .....</td><td style="text-align: center;">D</td></tr> <tr><td>Not quite so much .....</td><td style="text-align: center;">0</td></tr> <tr><td>Only a little .....</td><td style="text-align: center;">1</td></tr> <tr><td>Hardly at all .....</td><td style="text-align: center;">2</td></tr> <tr><td></td><td style="text-align: center;">3</td></tr> </table>	Definitely as much .....	D	Not quite so much .....	0	Only a little .....	1	Hardly at all .....	2		3	<p><b>I get a sort of frightened feeling like 'butterflies' in the stomach:</b></p> <table border="0"> <tr><td>Not at all .....</td><td style="text-align: center;">A</td></tr> <tr><td>Occasionally .....</td><td style="text-align: center;">0</td></tr> <tr><td>Quite often .....</td><td style="text-align: center;">1</td></tr> <tr><td>Very often .....</td><td style="text-align: center;">2</td></tr> <tr><td></td><td style="text-align: center;">3</td></tr> </table>	Not at all .....	A	Occasionally .....	0	Quite often .....	1	Very often .....	2		3
Definitely as much .....	D																				
Not quite so much .....	0																				
Only a little .....	1																				
Hardly at all .....	2																				
	3																				
Not at all .....	A																				
Occasionally .....	0																				
Quite often .....	1																				
Very often .....	2																				
	3																				
<p><b>I get a sort of frightened feeling as if something awful is about to happen:</b></p> <table border="0"> <tr><td>Very definitely and quite badly .....</td><td style="text-align: center;">A</td></tr> <tr><td>Yes, but not too badly .....</td><td style="text-align: center;">3</td></tr> <tr><td>A little, but it doesn't worry me .....</td><td style="text-align: center;">2</td></tr> <tr><td>Not at all .....</td><td style="text-align: center;">1</td></tr> <tr><td></td><td style="text-align: center;">0</td></tr> </table>	Very definitely and quite badly .....	A	Yes, but not too badly .....	3	A little, but it doesn't worry me .....	2	Not at all .....	1		0	<p><b>I have lost interest in my appearance:</b></p> <table border="0"> <tr><td>Definitely .....</td><td style="text-align: center;">D</td></tr> <tr><td>I don't take so much care as I should ..</td><td style="text-align: center;">3</td></tr> <tr><td>I may not take quite as much care ..</td><td style="text-align: center;">2</td></tr> <tr><td>I take just as much care as ever .....</td><td style="text-align: center;">1</td></tr> <tr><td></td><td style="text-align: center;">0</td></tr> </table>	Definitely .....	D	I don't take so much care as I should ..	3	I may not take quite as much care ..	2	I take just as much care as ever .....	1		0
Very definitely and quite badly .....	A																				
Yes, but not too badly .....	3																				
A little, but it doesn't worry me .....	2																				
Not at all .....	1																				
	0																				
Definitely .....	D																				
I don't take so much care as I should ..	3																				
I may not take quite as much care ..	2																				
I take just as much care as ever .....	1																				
	0																				
<p><b>I can laugh and see the funny side of things:</b></p> <table border="0"> <tr><td>As much as I always could .....</td><td style="text-align: center;">D</td></tr> <tr><td>Not quite so much now .....</td><td style="text-align: center;">0</td></tr> <tr><td>Definitely not so much now .....</td><td style="text-align: center;">1</td></tr> <tr><td>Not at all .....</td><td style="text-align: center;">2</td></tr> <tr><td></td><td style="text-align: center;">3</td></tr> </table>	As much as I always could .....	D	Not quite so much now .....	0	Definitely not so much now .....	1	Not at all .....	2		3	<p><b>I feel restless as if I have to be on the move:</b></p> <table border="0"> <tr><td>Very much indeed .....</td><td style="text-align: center;">A</td></tr> <tr><td>Quite a lot .....</td><td style="text-align: center;">3</td></tr> <tr><td>Not very much .....</td><td style="text-align: center;">2</td></tr> <tr><td>Not at all .....</td><td style="text-align: center;">1</td></tr> <tr><td></td><td style="text-align: center;">0</td></tr> </table>	Very much indeed .....	A	Quite a lot .....	3	Not very much .....	2	Not at all .....	1		0
As much as I always could .....	D																				
Not quite so much now .....	0																				
Definitely not so much now .....	1																				
Not at all .....	2																				
	3																				
Very much indeed .....	A																				
Quite a lot .....	3																				
Not very much .....	2																				
Not at all .....	1																				
	0																				
<p><b>Worrying thoughts go through my mind:</b></p> <table border="0"> <tr><td>A great deal of the time .....</td><td style="text-align: center;">A</td></tr> <tr><td>A lot of the time .....</td><td style="text-align: center;">3</td></tr> <tr><td>From time to time but not too often ..</td><td style="text-align: center;">2</td></tr> <tr><td>Only occasionally .....</td><td style="text-align: center;">1</td></tr> <tr><td></td><td style="text-align: center;">0</td></tr> </table>	A great deal of the time .....	A	A lot of the time .....	3	From time to time but not too often ..	2	Only occasionally .....	1		0	<p><b>I look forward with enjoyment to things:</b></p> <table border="0"> <tr><td>As much as ever I did .....</td><td style="text-align: center;">D</td></tr> <tr><td>Rather less than I used to .....</td><td style="text-align: center;">0</td></tr> <tr><td>Definitely less than I used to .....</td><td style="text-align: center;">1</td></tr> <tr><td>Hardly at all .....</td><td style="text-align: center;">2</td></tr> <tr><td></td><td style="text-align: center;">3</td></tr> </table>	As much as ever I did .....	D	Rather less than I used to .....	0	Definitely less than I used to .....	1	Hardly at all .....	2		3
A great deal of the time .....	A																				
A lot of the time .....	3																				
From time to time but not too often ..	2																				
Only occasionally .....	1																				
	0																				
As much as ever I did .....	D																				
Rather less than I used to .....	0																				
Definitely less than I used to .....	1																				
Hardly at all .....	2																				
	3																				
<p><b>I feel cheerful:</b></p> <table border="0"> <tr><td>Not at all .....</td><td style="text-align: center;">D</td></tr> <tr><td>Not often .....</td><td style="text-align: center;">3</td></tr> <tr><td>Sometimes .....</td><td style="text-align: center;">2</td></tr> <tr><td>Most of the time .....</td><td style="text-align: center;">1</td></tr> <tr><td></td><td style="text-align: center;">0</td></tr> </table>	Not at all .....	D	Not often .....	3	Sometimes .....	2	Most of the time .....	1		0	<p><b>I get sudden feelings of panic:</b></p> <table border="0"> <tr><td>Very often indeed .....</td><td style="text-align: center;">A</td></tr> <tr><td>Quite often .....</td><td style="text-align: center;">3</td></tr> <tr><td>Not very often .....</td><td style="text-align: center;">2</td></tr> <tr><td>Not at all .....</td><td style="text-align: center;">1</td></tr> <tr><td></td><td style="text-align: center;">0</td></tr> </table>	Very often indeed .....	A	Quite often .....	3	Not very often .....	2	Not at all .....	1		0
Not at all .....	D																				
Not often .....	3																				
Sometimes .....	2																				
Most of the time .....	1																				
	0																				
Very often indeed .....	A																				
Quite often .....	3																				
Not very often .....	2																				
Not at all .....	1																				
	0																				
<p><b>I can sit at ease and feel relaxed:</b></p> <table border="0"> <tr><td>Definitely .....</td><td style="text-align: center;">A</td></tr> <tr><td>Usually .....</td><td style="text-align: center;">0</td></tr> <tr><td>Not often .....</td><td style="text-align: center;">1</td></tr> <tr><td>Not at all .....</td><td style="text-align: center;">2</td></tr> <tr><td></td><td style="text-align: center;">3</td></tr> </table>	Definitely .....	A	Usually .....	0	Not often .....	1	Not at all .....	2		3	<p><b>I can enjoy a good book or radio or TV programme:</b></p> <table border="0"> <tr><td>Often .....</td><td style="text-align: center;">D</td></tr> <tr><td>Sometimes .....</td><td style="text-align: center;">0</td></tr> <tr><td>Not often .....</td><td style="text-align: center;">1</td></tr> <tr><td>Very seldom .....</td><td style="text-align: center;">2</td></tr> <tr><td></td><td style="text-align: center;">3</td></tr> </table>	Often .....	D	Sometimes .....	0	Not often .....	1	Very seldom .....	2		3
Definitely .....	A																				
Usually .....	0																				
Not often .....	1																				
Not at all .....	2																				
	3																				
Often .....	D																				
Sometimes .....	0																				
Not often .....	1																				
Very seldom .....	2																				
	3																				

(1) Calculate HAD sub-scores for both Anxiety (A) and Depression (D) [minimum = 0 ~ maximum = 21].

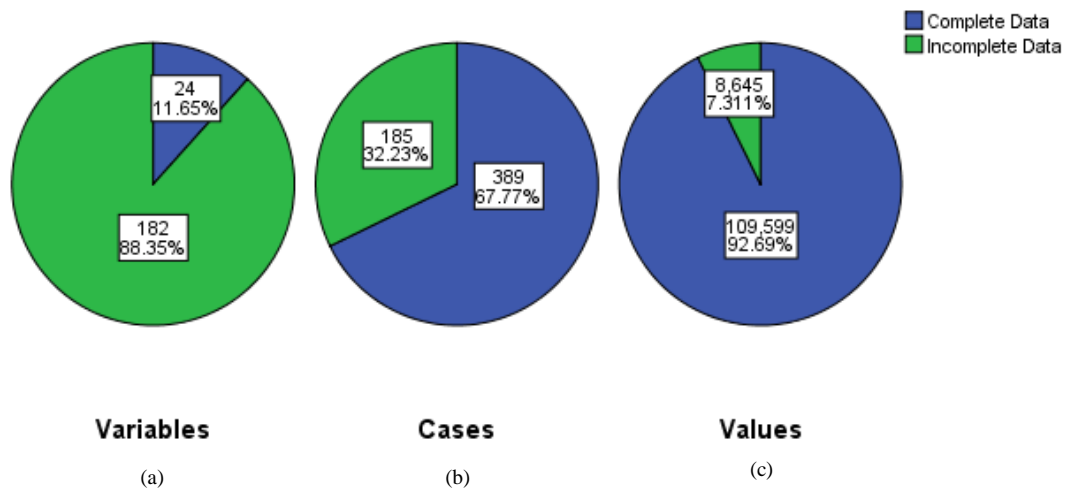
(2) Interpret results for either Anxiety and / or Depression using the following ranges: [0 - 7 Normal]; [8 - 10 Cause for concern - monitor for change]; [11 - 21 Probable clinical case requiring assessment].

## FOR REFERENCE ONLY

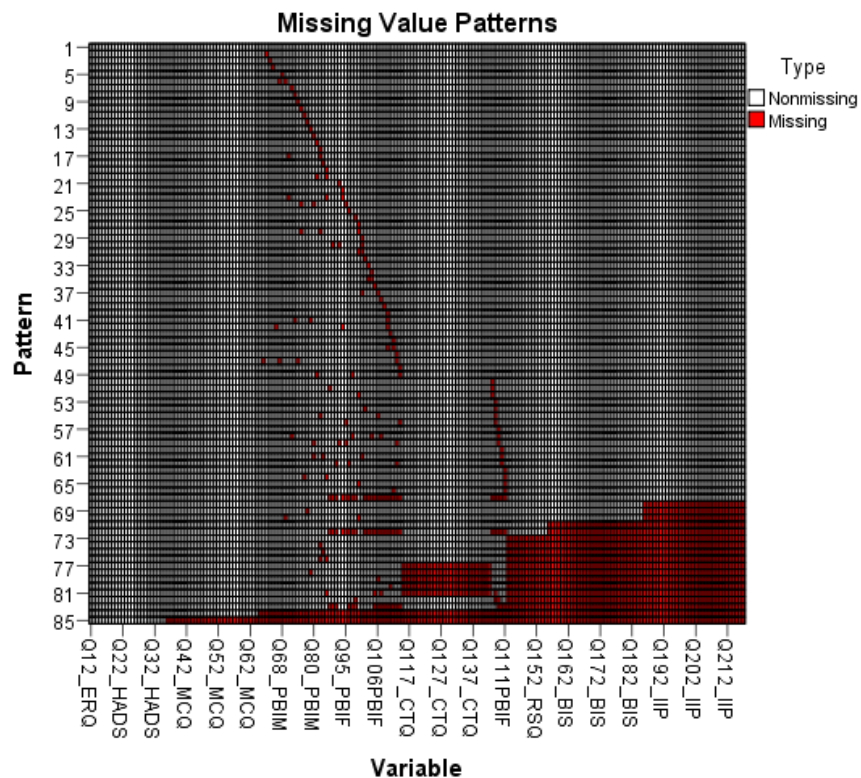


## Appendix 19: Missing Data

### Overall Summary of Missing Values



- (a) Variables: indicate the number and percentage of missing variables. In this case, 182 variables have some missing data.
- (b) Cases: indicate the number of cases that are missing at least 1 value. In this case, 185 variables are missing at least 1 value.
- (c) Values: this is the total missing data for all variables. In this case, 7.3 % of the values accounting for all variables are missing.



### Variable Summary

	Missing		Valid N
	N	Percent	
I am affected by another person's misery too much	66	11.5%	508
I let other people take advantage of me too much	66	11.5%	508
I argue with other people too much	66	11.5%	508
I tell personal things to other people too much	66	11.5%	508
I manipulate other people too much to get what I want	66	11.5%	508
I am overly generous to other people	66	11.5%	508
I put other people's needs before my own too much	66	11.5%	508
I try to control other people too much	66	11.5%	508
I want to be noticed too much	66	11.5%	508
I try to please other people too much	66	11.5%	508
I am too aggressive toward other people	66	11.5%	508
I open up to people too much	66	11.5%	508

Be assertive without worrying about hurting the other person's feelings	66	11.5%	508
Ask other people to get together socially with me	66	11.5%	508
Feel good about another person's happiness	66	11.5%	508
Put somebody else's needs before my own	66	11.5%	508
Really care about other people's problems	66	11.5%	508
Feel close to another person	66	11.5%	508
Be supportive of another person's goals in life	66	11.5%	508
Experience a feeling of love for another person	66	11.5%	508
Be firm when I need to be	66	11.5%	508
Get along with people	66	11.5%	508
Show affection to other people	66	11.5%	508
Socialise with other people	66	11.5%	508
Let other people know when I am angry	66	11.5%	508
Be assertive with another person	66	11.5%	508
Confront people with problems that come up	66	11.5%	508
Introduce myself to new people	66	11.5%	508
Tell a person to stop bothering me	66	11.5%	508
Keep things private from other people	66	11.5%	508
Join in on groups	66	11.5%	508
Say "no" to other people	66	11.5%	508
I am future oriented	60	10.5%	514
I like puzzles	60	10.5%	514
I am restless at the theater or lectures	60	10.5%	514
I am more interested in the present than the future	60	10.5%	514
I often have extraneous thoughts when thinking	60	10.5%	514
I spend or charge more than I earn	60	10.5%	514
I change hobbies	60	10.5%	514
I can only think about one thing at a time	60	10.5%	514
I buy things on impulse	60	10.5%	514
I change residences	60	10.5%	514
I am a steady thinker	60	10.5%	514

I act on the spur of the moment	60	10.5%	514
I get easily bored when solving thought problems	60	10.5%	514
I act "on impulse"	60	10.5%	514
I change jobs	60	10.5%	514
I like to think about complex problems	60	10.5%	514
I say things without thinking	60	10.5%	514
I plan for job security	60	10.5%	514
I am a careful thinker	60	10.5%	514
I "squirm" at plays or lectures	60	10.5%	514
I save regularly	60	10.5%	514
I concentrate easily	60	10.5%	514
I am self controlled	60	10.5%	514
I plan trips well ahead of time	60	10.5%	514
I have "racing" thoughts	60	10.5%	514
I don't "pay attention"	60	10.5%	514
I am happy-go-lucky	60	10.5%	514
I make-up my mind quickly	60	10.5%	514
I do things without thinking	60	10.5%	514
I plan tasks carefully	60	10.5%	514
I worry about being abandoned	57	9.9%	517
I am nervous when anyone gets too close to me	57	9.9%	517
My desire to merge completely sometimes scares people away	57	9.9%	517
People are never there when you need them	57	9.9%	517
I worry that others don't value me as much as I value them	57	9.9%	517
I worry about others getting too close to me	57	9.9%	517
I find it difficult to trust others completely	57	9.9%	517
I often worry that romantic partners don't really love me and won't want to stay with me	57	9.9%	517
I worry about being alone	57	9.9%	517

I am not sure that I can always depend on others to be there when I need them	57	9.9%	517
I am comfortable without close emotional relationships	57	9.9%	517
I worry that I will be hurt if I allow myself to become too close to others	57	9.9%	517
I find it difficult to depend on others	57	9.9%	517
Let me go out as often as I wanted	49	8.5%	525
Did not praise me	47	8.2%	527
Did not want me to grow up	47	8.2%	527
Liked me to make my own decisions	47	8.2%	527
Did not help me as much as I needed	47	8.2%	527
My family was a source of strength and support	46	8.0%	528
I believe that I was sexually abused	46	8.0%	528
There was someone to take me to the doctor if I needed it	46	8.0%	528
I believe that I was emotionally abused	46	8.0%	528
Someone molested me	46	8.0%	528
Someone tried to make me do sexual things or watch sexual things	46	8.0%	528
I had the best family in the world	46	8.0%	528
Someone threatened to hurt me or tell lies about me unless I did something sexual with them	46	8.0%	528
Someone tried to touch me in a sexual way, or tried to make me touch them	46	8.0%	528
People in my family felt close to each other	46	8.0%	528
I felt like someone in my family hated me.	46	8.0%	528
I got hit or beaten so badly that it was noticed by someone like a teacher, neighbor, or doctor.	46	8.0%	528
I had the perfect childhood	46	8.0%	528
I believe that I was physically abused	46	8.0%	528

People in my family said hurtful or insulting things to me	46	8.0%	528
People in my family looked out for each other	46	8.0%	528
I was punished with a belt, a board, a cord, or some other hard object	46	8.0%	528
People in my family hit me so hard that it left me with bruises or marks	46	8.0%	528
There was nothing I wanted to change about my family	46	8.0%	528
I got hit so hard by someone in my family that I had to see a doctor or go to the hospital	46	8.0%	528
I thought that my parents wished I had never been born	46	8.0%	528
I felt loved	46	8.0%	528
I had to wear dirty clothes	46	8.0%	528
There was someone in my family who helped me feel that I was important or special	46	8.0%	528
My parents were too drunk or high to take care of the family	46	8.0%	528
People in my family called me things like "stupid," "lazy," or "ugly"	46	8.0%	528
I knew that there was someone to take care of me and protect me	46	8.0%	528
I didn't have enough to eat	46	8.0%	528
Tried to make me feel dependent of her/him	46	8.0%	528
Did not talk with me very much	46	8.0%	528
Made me feel I wasn't wanted	46	8.0%	528
Did not seem to understand what I needed or wanted	46	8.0%	528
Tried to control everything I did	46	8.0%	528
Let me dress in any way I pleased	45	7.8%	529
Was overprotective of me	45	7.8%	529
Could make me feel better when I was upset	45	7.8%	529

Frequently smiled at me	45	7.8%	529
Appeared to understand my problems and worries	45	7.8%	529
Seemed emotionally cold to me	45	7.8%	529
Let me do those things I liked doing	45	7.8%	529
Gave me as much freedom as I wanted	45	7.8%	529
Did not want me to grow up	45	7.8%	529
Gave me as much freedom as I wanted	44	7.7%	530
Felt I could not look after myself unless she/he was around	44	7.7%	530
Let me decide things for myself	44	7.7%	530
Was affectionate to me	44	7.7%	530
Spoke to me in a warm and friendly voice	44	7.7%	530
Was affectionate to me	44	7.7%	530
Tended to baby me	43	7.5%	531
Enjoyed talking things over with me	43	7.5%	531
Invaded my privacy	43	7.5%	531
Was overprotective of me	43	7.5%	531
Felt I could not look after myself unless she/he was around	42	7.3%	532
Did not talk with me very much	42	7.3%	532
Could make me feel better when I was upset	41	7.1%	533
Made me feel I wasn't wanted	41	7.1%	533
Did not seem to understand what I needed or wanted	41	7.1%	533
Invaded my privacy	41	7.1%	533
Frequently smiled at me	40	7.0%	534
Tried to control everything I did	40	7.0%	534
Enjoyed talking things over with me	39	6.8%	535
Let me dress in any way I pleased	38	6.6%	536
Let me go out as often as I wanted	38	6.6%	536
Tried to make me feel dependent on her/him	38	6.6%	536
Let me decide things for myself	38	6.6%	536
Seemed emotionally cold to me	38	6.6%	536

Spoke to me in a warm and friendly voice	38	6.6%	536
Did not praise me	37	6.4%	537
Tended to baby me	37	6.4%	537
Liked me to make my own decisions	37	6.4%	537
Appeared to understand my problems and worries	37	6.4%	537
Did not help me as much as I needed	37	6.4%	537
Let me do those things I liked doing	36	6.3%	538
I constantly examine my thoughts	20	3.5%	554
I have little confidence in my memory for actions	20	3.5%	554
I need to worry in order to work well	20	3.5%	554
If I could not control my thoughts, I would not be able to function	20	3.5%	554
I do not trust my memory	20	3.5%	554
It is bad to think certain thoughts	20	3.5%	554
I have little confidence in my memory for places	20	3.5%	554
Worrying helps me to solve problems	20	3.5%	554
I will be punished for not controlling certain thoughts	20	3.5%	554
When I start worrying, I cannot stop	20	3.5%	554
Not being able to control my thoughts is a sign of weakness	20	3.5%	554
Worrying helps me cope	20	3.5%	554
I pay close attention to the way my mind works	20	3.5%	554
I have a poor memory	20	3.5%	554
I am constantly aware of my thinking	20	3.5%	554
My worrying could make me go mad	20	3.5%	554
My memory can mislead me at times	20	3.5%	554
I should be in control of my thoughts all of the time	20	3.5%	554
I monitor my thoughts	20	3.5%	554
I cannot ignore my worrying thoughts	20	3.5%	554
My worrying thoughts persist, no matter how I try to stop them	20	3.5%	554



I have little confidence in my memory for words and names	20	3.5%	554
I need to worry in order to remain organized	20	3.5%	554
If I did not control a worrying thought, and then it happened, it would be my fault	20	3.5%	554
I am aware of the way my mind works when I am thinking through a problem	20	3.5%	554
I could make myself sick with worrying	20	3.5%	554
I think a lot about my thoughts	20	3.5%	554
My worrying is dangerous for me	20	3.5%	554
Worrying helps me to avoid problems in the future	20	3.5%	554
I can enjoy a good book or radio or TV program	0	0.0%	574
I get sudden feelings of panic	0	0.0%	574
I look forward with enjoyment to things	0	0.0%	574
I feel restless as I have to be on the move	0	0.0%	574
I have lost interest in my appearance	0	0.0%	574
I get a sort of frightened feeling like 'butterflies' in the stomach	0	0.0%	574
I feel as if I am slowed down	0	0.0%	574
I can sit at ease and feel relaxed	0	0.0%	574
I feel cheerful	0	0.0%	574
Worrying thoughts go through my mind	0	0.0%	574
I can laugh and see the funny side of things	0	0.0%	574
I get a sort of frightened feeling as if something awful is about to happen	0	0.0%	574
I still enjoy the things I used to enjoy	0	0.0%	574
I feel tense or 'wound up'	0	0.0%	574
When I want to feel less negative emotion, I change the way I'm thinking about the situation	0	0.0%	574
When I am feeling negative emotions, I make sure not to express them	0	0.0%	574

I control my emotions by changing the way I think about the situation I'm in	0	0.0%	574
When I want to feel more positive emotion, I change the way I'm thinking about the situation	0	0.0%	574
I control my emotions by not expressing them	0	0.0%	574
When I'm faced with a stressful situation, I make myself think about it in a way that helps me stay calm	0	0.0%	574
When I am feeling positive emotions, I am careful not to express them	0	0.0%	574
When I want to feel less negative emotion (such as sadness or anger), I change what I'm thinking about	0	0.0%	574
I keep my emotions to myself	0	0.0%	574
When I want to feel more positive emotion (such as joy or amusement), I change what I'm thinking about	0	0.0%	574

**Appendix 20:** Tests of normality

	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Question 12	.232	389	.000	.887	389	.000
Question 13	.189	389	.000	.896	389	.000
Question 14	.228	389	.000	.888	389	.000
Question 15	.257	389	.000	.826	389	.000
Question 16	.220	389	.000	.882	389	.000
Question 17	.191	389	.000	.902	389	.000
Question 18	.248	389	.000	.879	389	.000
Question 19	.232	389	.000	.908	389	.000
Question 20	.211	389	.000	.907	389	.000
Question 21	.241	389	.000	.903	389	.000
Question 22	.344	389	.000	.793	389	.000
Question 23	.318	389	.000	.720	389	.000
Question 24	.202	389	.000	.869	389	.000
Question 25	.473	389	.000	.529	389	.000
Question 26	.231	389	.000	.878	389	.000
Question 27	.293	389	.000	.753	389	.000
Question 28	.268	389	.000	.827	389	.000
Question 29	.253	389	.000	.842	389	.000
Question 30	.276	389	.000	.831	389	.000
Question 31	.349	389	.000	.735	389	.000
Question 32	.240	389	.000	.868	389	.000
Question 33	.390	389	.000	.647	389	.000
Question 34	.254	389	.000	.834	389	.000
Question 35	.442	389	.000	.579	389	.000
Question 36	.257	389	.000	.815	389	.000
Question 37	.217	389	.000	.845	389	.000
Question 38	.258	389	.000	.820	389	.000

Question 39	.215	389	.000	.830	389	.000
Question 40	.231	389	.000	.859	389	.000
Question 41	.319	389	.000	.761	389	.000
Question 42	.233	389	.000	.852	389	.000
Question 43	.274	389	.000	.794	389	.000
Question 44	.214	389	.000	.839	389	.000
Question 45	.218	389	.000	.863	389	.000
Question 46	.246	389	.000	.872	389	.000
Question 47	.226	389	.000	.837	389	.000
Question 48	.241	389	.000	.863	389	.000
Question 49	.348	389	.000	.713	389	.000
Question 50	.190	389	.000	.870	389	.000
Question 51	.316	389	.000	.752	389	.000
Question 52	.203	389	.000	.879	389	.000
Question 53	.295	389	.000	.772	389	.000
Question 54	.316	389	.000	.768	389	.000
Question 55	.235	389	.000	.825	389	.000
Question 56	.481	389	.000	.472	389	.000
Question 57	.239	389	.000	.832	389	.000
Question 58	.388	389	.000	.663	389	.000
Question 59	.236	389	.000	.817	389	.000
Question 60	.364	389	.000	.696	389	.000
Question 61	.269	389	.000	.800	389	.000
Question 62	.285	389	.000	.787	389	.000
Question 63	.399	389	.000	.656	389	.000
Question 64	.209	389	.000	.854	389	.000
Question 65	.334	389	.000	.735	389	.000
Question 66	.324	389	.000	.764	389	.000
Question 67	.274	389	.000	.774	389	.000
Question 68	.385	389	.000	.685	389	.000
Question 69	.240	389	.000	.858	389	.000
Question 70	.380	389	.000	.681	389	.000

Question 71	.240	389	.000	.819	389	.000
Question 72	.210	389	.000	.846	389	.000
Question 73	.244	389	.000	.823	389	.000
Question 74	.254	389	.000	.811	389	.000
Question 75	.226	389	.000	.838	389	.000
Question 76	.344	389	.000	.732	389	.000
Question 77	.225	389	.000	.835	389	.000
Question 78	.216	389	.000	.848	389	.000
Question 79	.261	389	.000	.816	389	.000
Question 80	.452	389	.000	.557	389	.000
Question 81	.250	389	.000	.809	389	.000
Question 82	.358	389	.000	.710	389	.000
Question 83	.312	389	.000	.763	389	.000
Question 84	.353	389	.000	.717	389	.000
Question 85	.255	389	.000	.871	389	.000
Question 86	.255	389	.000	.871	389	.000
Question 87	.220	389	.000	.854	389	.000
Question 88	.349	389	.000	.729	389	.000
Question 89	.222	389	.000	.848	389	.000
Question 90	.252	389	.000	.799	389	.000
Question 91	.234	389	.000	.831	389	.000
Question 92	.273	389	.000	.779	389	.000
Question 93	.266	389	.000	.801	389	.000
Question 94	.198	389	.000	.878	389	.000
Question 95	.247	389	.000	.800	389	.000
Question 96	.281	389	.000	.782	389	.000
Question 97	.275	389	.000	.801	389	.000
Question 98	.309	389	.000	.763	389	.000
Question 99	.366	389	.000	.684	389	.000
Question 100	.212	389	.000	.872	389	.000
Question 101	.252	389	.000	.806	389	.000
Question 102	.334	389	.000	.731	389	.000

Question 103	.242	389	.000	.868	389	.000
Question 104	.253	389	.000	.789	389	.000
Question 105	.404	389	.000	.626	389	.000
Question 106	.241	389	.000	.865	389	.000
Question 107	.196	389	.000	.856	389	.000
Question 108	.381	389	.000	.672	389	.000
Question 109	.416	389	.000	.631	389	.000
Question 110	.254	389	.000	.855	389	.000
Question 111	.248	389	.000	.862	389	.000
Question 112	.271	389	.000	.804	389	.000
Question 113	.282	389	.000	.784	389	.000
Question 114	.228	389	.000	.832	389	.000
Question 115	.481	389	.000	.442	389	.000
Question 116	.451	389	.000	.544	389	.000
Question 117	.271	389	.000	.788	389	.000
Question 118	.513	389	.000	.340	389	.000
Question 119	.363	389	.000	.695	389	.000
Question 120	.503	389	.000	.399	389	.000
Question 121	.381	389	.000	.661	389	.000
Question 122	.462	389	.000	.520	389	.000
Question 123	.531	389	.000	.155	389	.000
Question 124	.217	389	.000	.897	389	.000
Question 125	.484	389	.000	.448	389	.000
Question 126	.482	389	.000	.477	389	.000
Question 127	.264	389	.000	.795	389	.000
Question 128	.231	389	.000	.842	389	.000
Question 129	.516	389	.000	.338	389	.000
Question 130	.220	389	.000	.887	389	.000
Question 131	.532	389	.000	.165	389	.000
Question 132	.427	389	.000	.592	389	.000
Question 133	.236	389	.000	.853	389	.000
Question 134	.516	389	.000	.268	389	.000

Question 135	.527	389	.000	.098	389	.000
Question 136	.201	389	.000	.889	389	.000
Question 137	.525	389	.000	.217	389	.000
Question 138	.526	389	.000	.212	389	.000
Question 139	.430	389	.000	.566	389	.000
Question 140	.492	389	.000	.367	389	.000
Question 141	.531	389	.000	.178	389	.000
Question 142	.273	389	.000	.795	389	.000
Question 143	.166	389	.000	.915	389	.000
Question 144	.168	389	.000	.902	389	.000
Question 145	.199	389	.000	.886	389	.000
Question 146	.159	389	.000	.916	389	.000
Question 147	.166	389	.000	.906	389	.000
Question 148	.161	389	.000	.894	389	.000
Question 149	.176	389	.000	.900	389	.000
Question 150	.204	389	.000	.878	389	.000
Question 151	.160	389	.000	.903	389	.000
Question 152	.219	389	.000	.884	389	.000
Question 153	.293	389	.000	.737	389	.000
Question 154	.221	389	.000	.871	389	.000
Question 155	.226	389	.000	.843	389	.000
Question 156	.225	389	.000	.859	389	.000
Question 157	.304	389	.000	.806	389	.000
Question 158	.226	389	.000	.876	389	.000
Question 159	.241	389	.000	.871	389	.000
Question 160	.228	389	.000	.824	389	.000
Question 161	.239	389	.000	.868	389	.000
Question 162	.205	389	.000	.853	389	.000
Question 163	.249	389	.000	.844	389	.000
Question 164	.258	389	.000	.868	389	.000
Question 165	.211	389	.000	.874	389	.000
Question 166	.249	389	.000	.809	389	.000

Question 167	.264	389	.000	.835	389	.000
Question 168	.197	389	.000	.879	389	.000
Question 169	.276	389	.000	.836	389	.000
Question 170	.213	389	.000	.856	389	.000
Question 171	.257	389	.000	.796	389	.000
Question 172	.316	389	.000	.804	389	.000
Question 173	.257	389	.000	.797	389	.000
Question 174	.326	389	.000	.798	389	.000
Question 175	.287	389	.000	.834	389	.000
Question 176	.222	389	.000	.837	389	.000
Question 177	.283	389	.000	.850	389	.000
Question 178	.233	389	.000	.840	389	.000
Question 179	.244	389	.000	.813	389	.000
Question 180	.301	389	.000	.772	389	.000
Question 181	.258	389	.000	.869	389	.000
Question 182	.285	389	.000	.852	389	.000
Question 183	.241	389	.000	.808	389	.000
Question 184	.196	389	.000	.871	389	.000
Question 185	.238	389	.000	.861	389	.000
Question 186	.224	389	.000	.895	389	.000
Question 187	.214	389	.000	.898	389	.000
Question 188	.269	389	.000	.781	389	.000
Question 189	.187	389	.000	.910	389	.000
Question 190	.186	389	.000	.896	389	.000
Question 191	.168	389	.000	.916	389	.000
Question 192	.163	389	.000	.910	389	.000
Question 193	.176	389	.000	.906	389	.000
Question 194	.205	389	.000	.883	389	.000
Question 195	.196	389	.000	.868	389	.000
Question 196	.259	389	.000	.801	389	.000
Question 197	.202	389	.000	.896	389	.000
Question 198	.283	389	.000	.768	389	.000



Question 199	.351	389	.000	.693	389	.000
Question 200	.271	389	.000	.785	389	.000
Question 201	.318	389	.000	.738	389	.000
Question 202	.272	389	.000	.774	389	.000
Question 203	.331	389	.000	.724	389	.000
Question 204	.227	389	.000	.860	389	.000
Question 205	.187	389	.000	.904	389	.000
Question 206	.241	389	.000	.813	389	.000
Question 207	.346	389	.000	.709	389	.000
Question 208	.197	389	.000	.905	389	.000
Question 209	.232	389	.000	.859	389	.000
Question 210	.252	389	.000	.809	389	.000
Question 211	.218	389	.000	.891	389	.000
Question 212	.206	389	.000	.881	389	.000

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